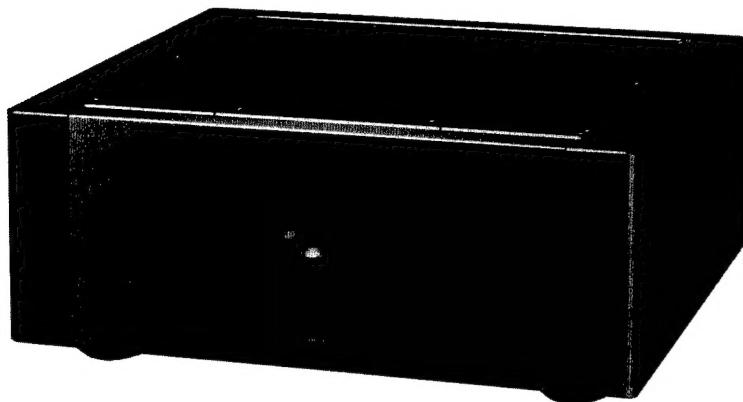


# TA-NR1

## SERVICE MANUAL

US Model  
Germany Model



### SPECIFICATIONS

#### Amplifier section

Type	Pure A-class monaural power amplifier
Circuitry	Complementary Darlington SEPP with all stages directly coupled
Power bandwidth (IHF)	5 Hz - 50 kHz (50 W output, 8 ohms, 0.1% THD)
Overall output (20 Hz - 20 kHz)	200 W (4-ohm load, 0.08% THD) 100 W (8-ohm load, 0.05% THD)
Frequency response	5 Hz - 100 kHz $\pm 3$ dB
Input sensitivity	UNBALANCED: 1.1 V (47 kohms) BALANCED: 1.1 V (600 ohms)
Damping factor	50 (8 ohms, 1 kHz)
Residual noise	Less than 30 $\mu$ V
Signal-to-noise ratio	120 dB
Outputs	SPEAKER terminals Accepts speakers of 4 - 16 ohms.

#### General

Power requirements	120 V AC, 60 Hz (US model) 220 - 230 V AC, 50/60 Hz (Germany model)
Power consumption	300 W
Dimensions	Approx. 466 x 188 x 462 mm (w/h/d) (18 $\frac{5}{8}$ x 7 $\frac{1}{2}$ x 18 $\frac{1}{4}$ inches)
Weight	Approx. 47.5 kg (104 lb 12 oz.)

Design and specifications subject to change without notice.



MONAURAL POWER AMPLIFIER  
**SONY**<sup>®</sup>

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## SERVICING NOTE

1. For protection against scratching in the time of repair and maintenance inspection be sure to lay protective materials, such as a protection sheet, under the set.
2. Do not check the input transformer T1 for continuity. (If checked, the core will magnetized, deteriorating the sound quality.)
3. This set uses select component parts. For replacement of any part, a new genuine part must be used.
4. To prevent a secondary failure, the check of the drive stage, etc. should be made after the final stage has been removed.
5. When a stranded signal-core wire was removed for repair, it must be again wired as before the repair.

## SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK  OR DOTTED LINE WITH MARK  ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

## SAFETY CHECK-OUT

After correcting the original service problem, perform the following safety check before releasing the set to the customer:

Check the antenna terminals, metal trim, "metallized" knobs, screws, and all other exposed metal parts for AC leakage. Check leakage as described below.

## LEAKAGE TEST

The AC leakage from any exposed metal part to earth ground and from all exposed metal parts to any exposed metal part having a return to chassis, must not exceed 0.5 mA (500 microamper). Leakage current can be measured by any one of three methods.

1. A commercial leakage tester, such as the Simpson 229 or RCA WT-540A. Follow the manufacturers' instructions to use these instruments.
2. A battery-operated AC milliammeter. The Data Precision 245 digital multimeter is suitable for this job.
3. Measuring the voltage drop across a resistor by means of a VOM or battery-operated AC voltmeter. The "limit" indication is 0.75 V, so analog meters must have an accurate low-voltage scale. The Simpson 250 and Sanwa SH-63Trd are examples of a passive VOM that is suitable. Nearly all battery operated digital multimeters that have a 2 V AC range are suitable. (See Fig. A)

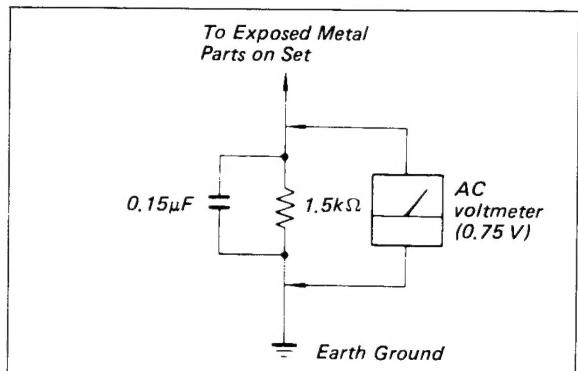


Fig. A. Using an AC voltmeter to check AC leakage.

# SECTION 1

## GENERAL

### 1-1. LOCATION OF CONTROLS

This section is extracted from instruction manual.

#### Front Panel

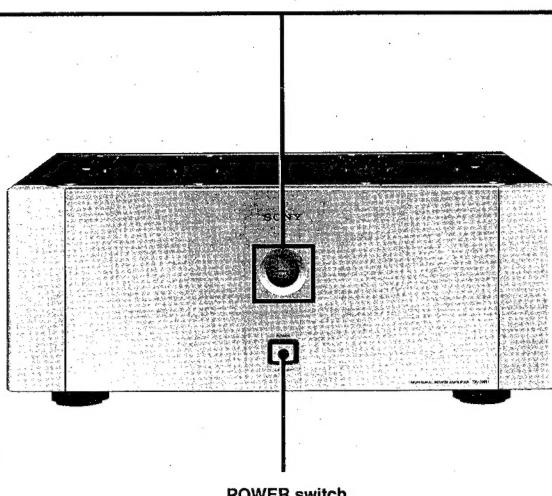
##### Display window

**Protection indicator:** Lights red when the POWER switch is turned ON and stays red for approximately 15 seconds. The red light indicates that the protection circuit is activated. The indicator lights green when the protection circuit is canceled and the amplifier is ready to operate. If the indicator changes from green to red while the unit is operating, the unit has encountered an abnormality and has activated the protection circuit. (When the protection circuit is activated, no sound is output to the speaker.) If this occurs, check to see if the SPEAKER terminals are short-circuited or if a DC voltage is being applied to the INPUT terminal.

**Temperature indicator:** Indicates the internal temperature of the amplifier. Check the internal temperature to drive the amplifier in a good condition.

**When the needle is in the C range:** The amplifier's internal temperature is within the proper range.

**When the needle is in the H range:** The amplifier's internal temperature has exceeded the proper range. This occurs when the amplifier is used for a long period of time under severe operating conditions. If this happens, you should let the amplifier cool down by turning the power off for a while or moving it to a location which is better ventilated.



POWER switch

#### Rear Panel

##### UNBALANCED INPUT terminal

When making a monaural connection, connect this input terminal to your preamplifier's output terminal.

##### BALANCED Cannon XLR connector input terminal

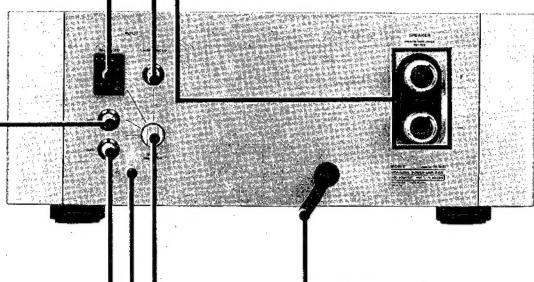
When making a balanced connection using Cannon XLR connectors, connect this input terminal to your preamplifier's output terminal.

- 1 GROUND
- 2 HOT (+)
- 3 COLD (-)



##### HOT (+) INPUT terminal

Use this terminal when making a bridge connection where two amplifiers are used for each channel. Set the INPUT SELECTOR switch to HOT. (See page 7.)



##### COLD (-) INPUT terminal

Use this terminal when making a bridge connection where two amplifiers are used for each channel. Set the INPUT SELECTOR switch to COLD. (See page 7.)

##### SPEAKER terminals

These are screw-type terminals for ensuring positive speaker cord connections. Speaker cords with core wire diameters of up to 12 mm can be used. It is recommended to select a speaker with an allowable input rating large enough to handle the effective output power of the amplifier. Use a speaker with an impedance of 4 – 16 ohms when the amplifier is used as a normal monaural amplifier, and use a speaker with an impedance of 8 – 16 ohms when the amplifier is used in a bridge connection.

##### INPUT SELECTOR switch

Set to the position corresponding to the input terminal connection.

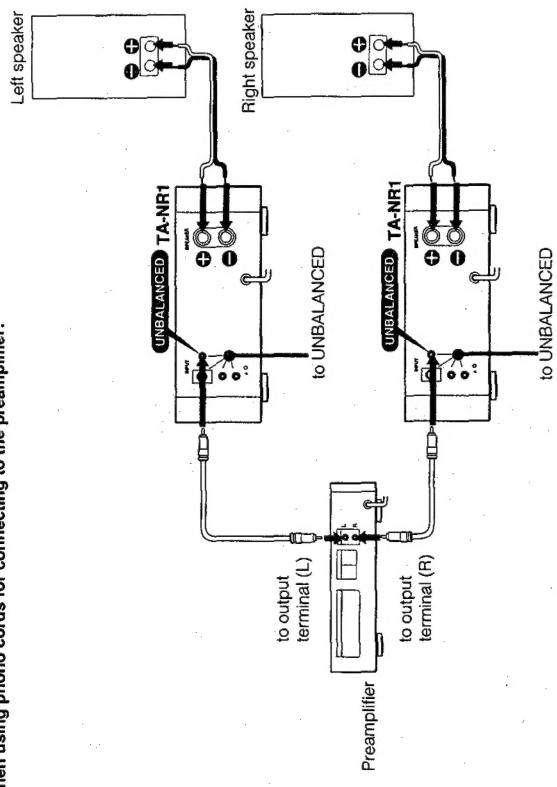
##### Ground terminal (GND)

Connect a ground wire to this terminal.

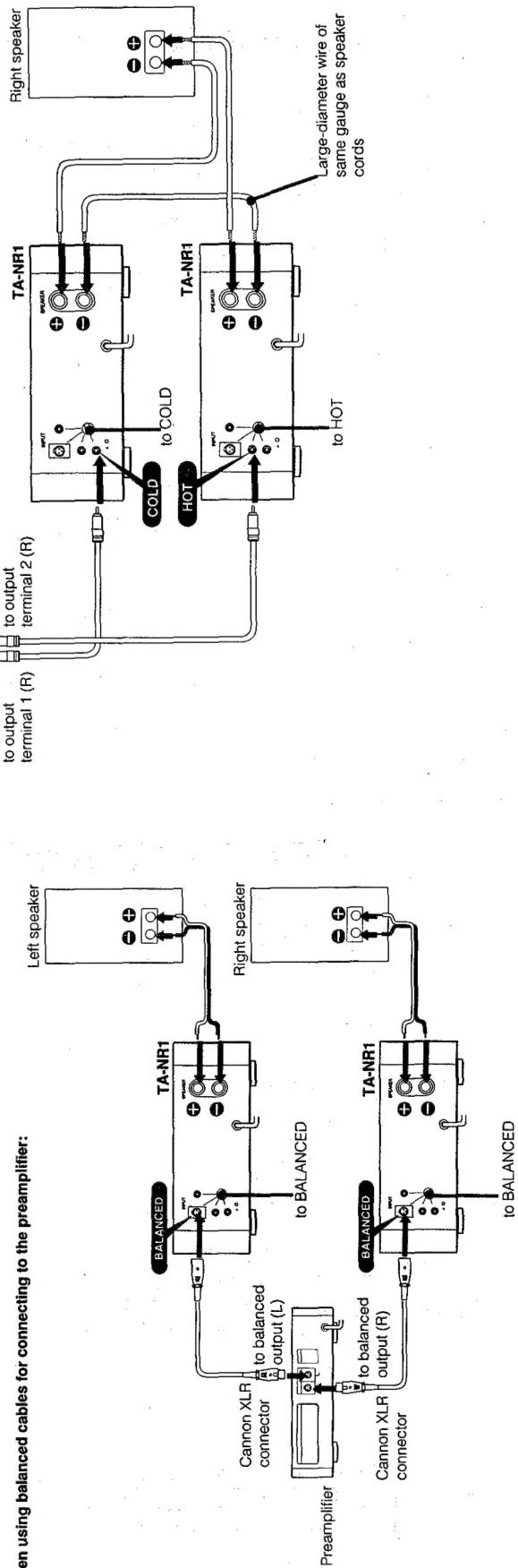
## 1.2. CONNECTIONS

## Monaural amplifier connection

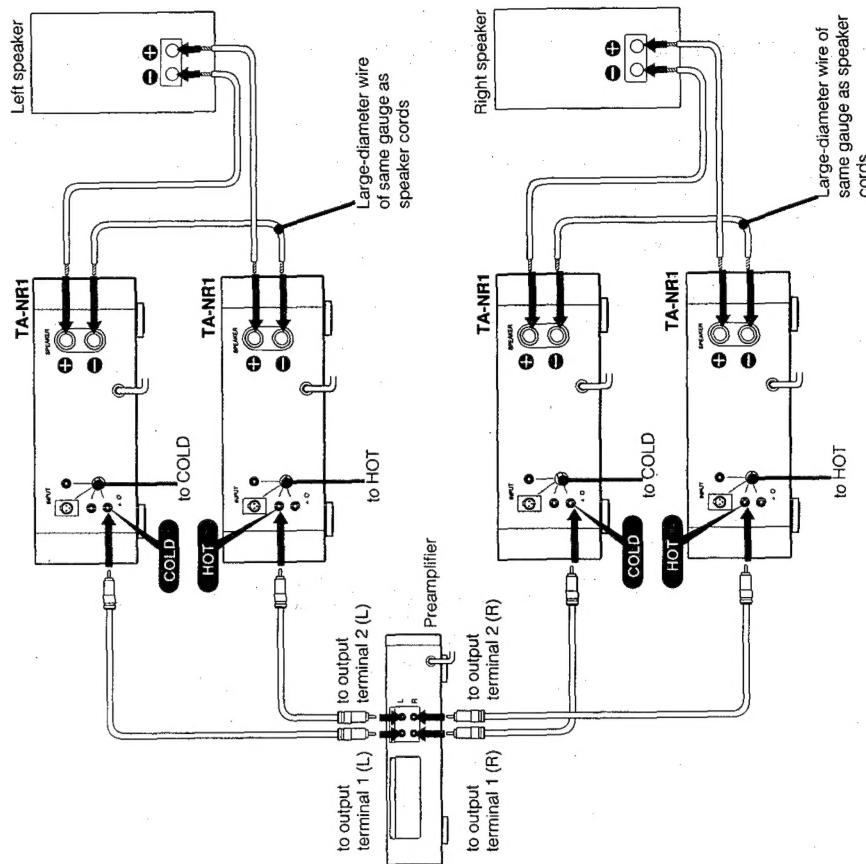
When using phono cords for connecting to the preamplifier:



When using balanced cables for connecting to the preamplifier:



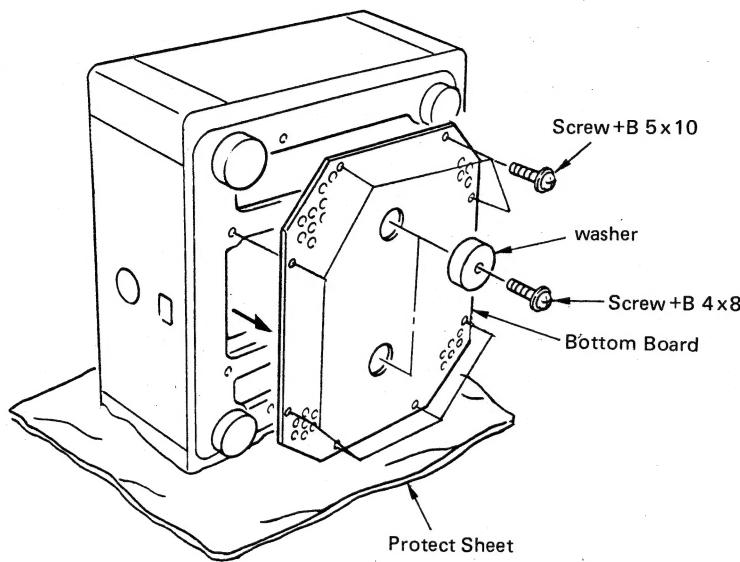
## Bridge connection using two amplifiers for each channel



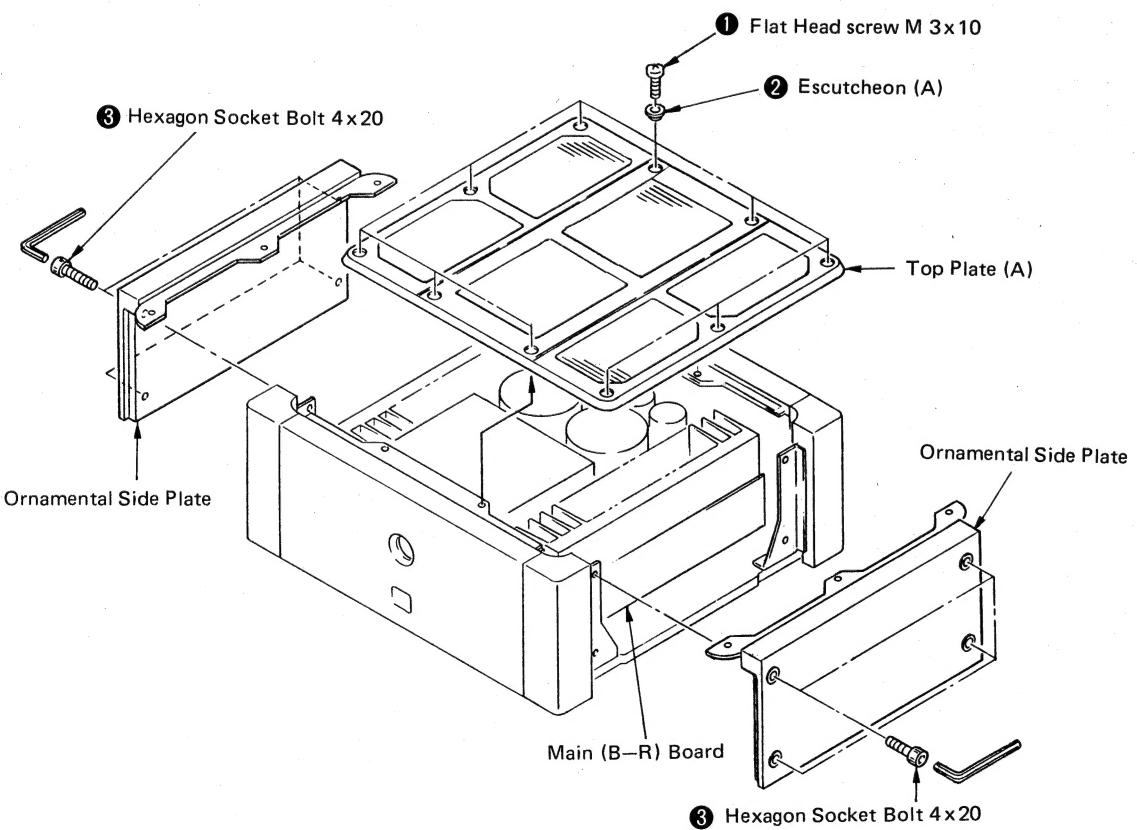
## SECTION 2 DISASSEMBLY

Note: Follow the disassembly procedure in the numerical order given.

### [ PS BOARD, FUSE BOARD ]

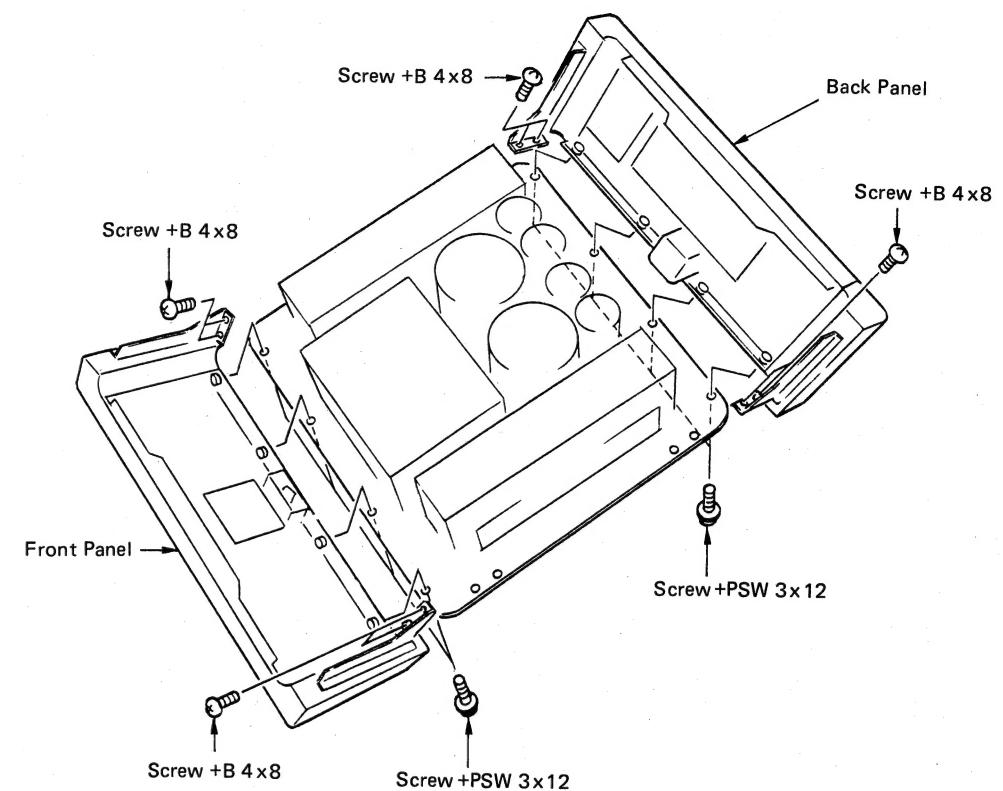


### [ MAIN (B-L)/(B-R) BOARD, IC BOARD ]



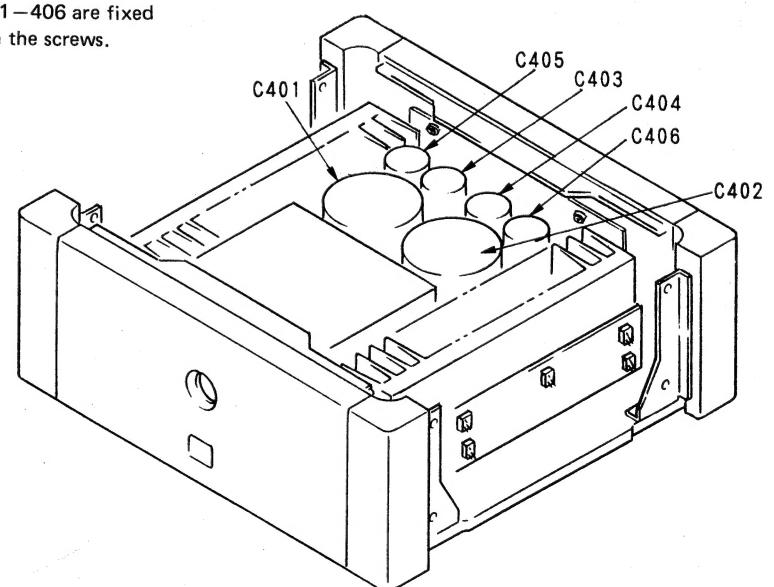
### [ FRONT PANEL SIDE: DRIVE BOARD, LED (L)/(R) BOARD, METER ]

### [ BACK PANEL SIDE: MAIN (A) BOARD, SP.TM BOARD ]



### [ LOCATION OF ELECTRICAL CAPACITOR (PS BOARD) ]

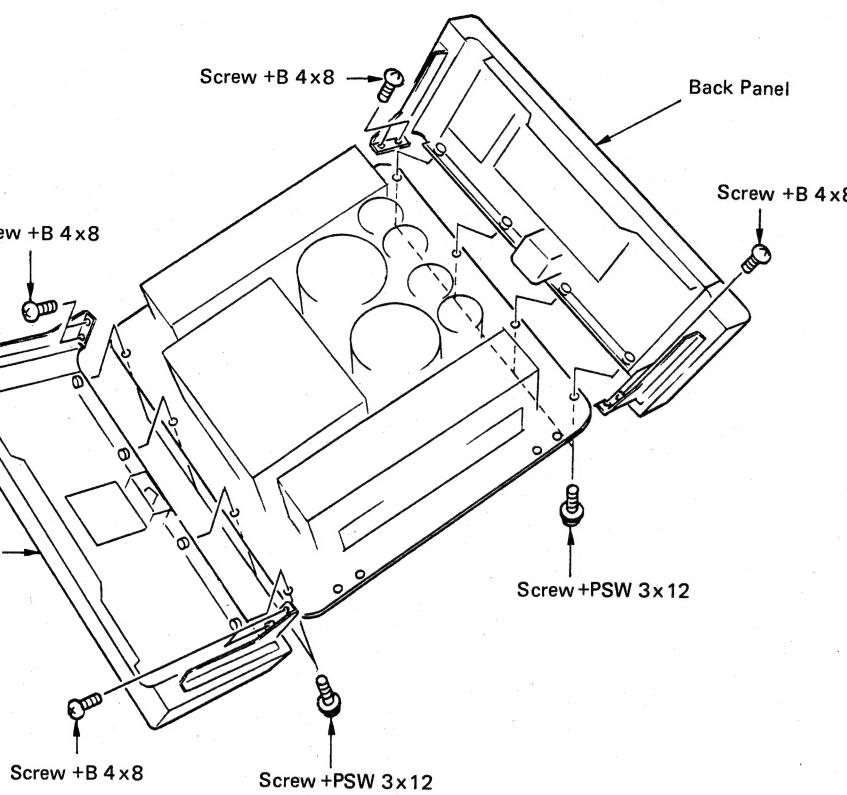
C401—406 are fixed with the screws.



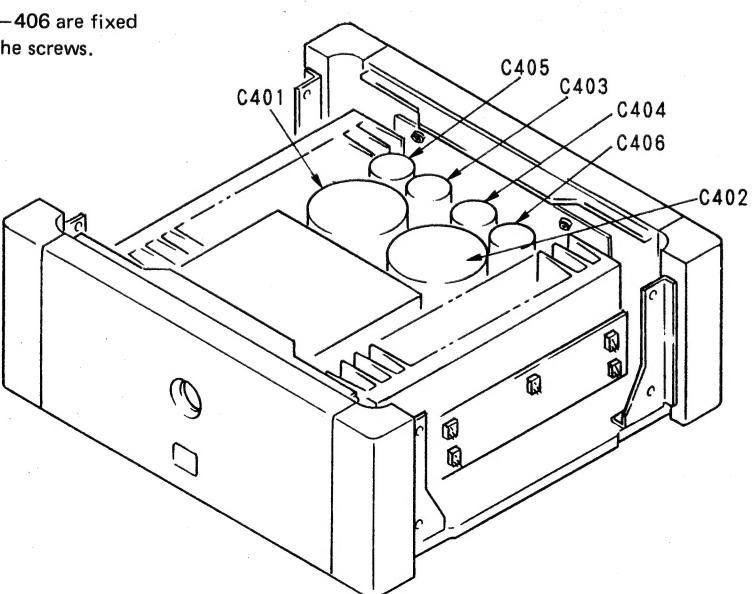
## SECTION 3 ELECTRICAL ADJUSTMENTS

EL SIDE: DRIVE BOARD, LED (L)/(R) BOARD, METER ]

L SIDE: MAIN (A) BOARD, SP.TM BOARD ]



N OF ELECTRICAL CAPACITOR (PS BOARD) ]



### • Precautions for adjustment.

- Before starting the adjustment, keep the unit powered for about 10 minutes under the conditions of no load and no signal.
- In the process of adjustment, heat dissipation should be taken into account with caution to protect the unit from direct wind blows. If not, the measurements may fluctuate.
- This adjustment must be made after such a major component as the final-stage transistor is replaced.

### [ IDLING CURRENT ADJUSTMENT ]

#### Procedure:

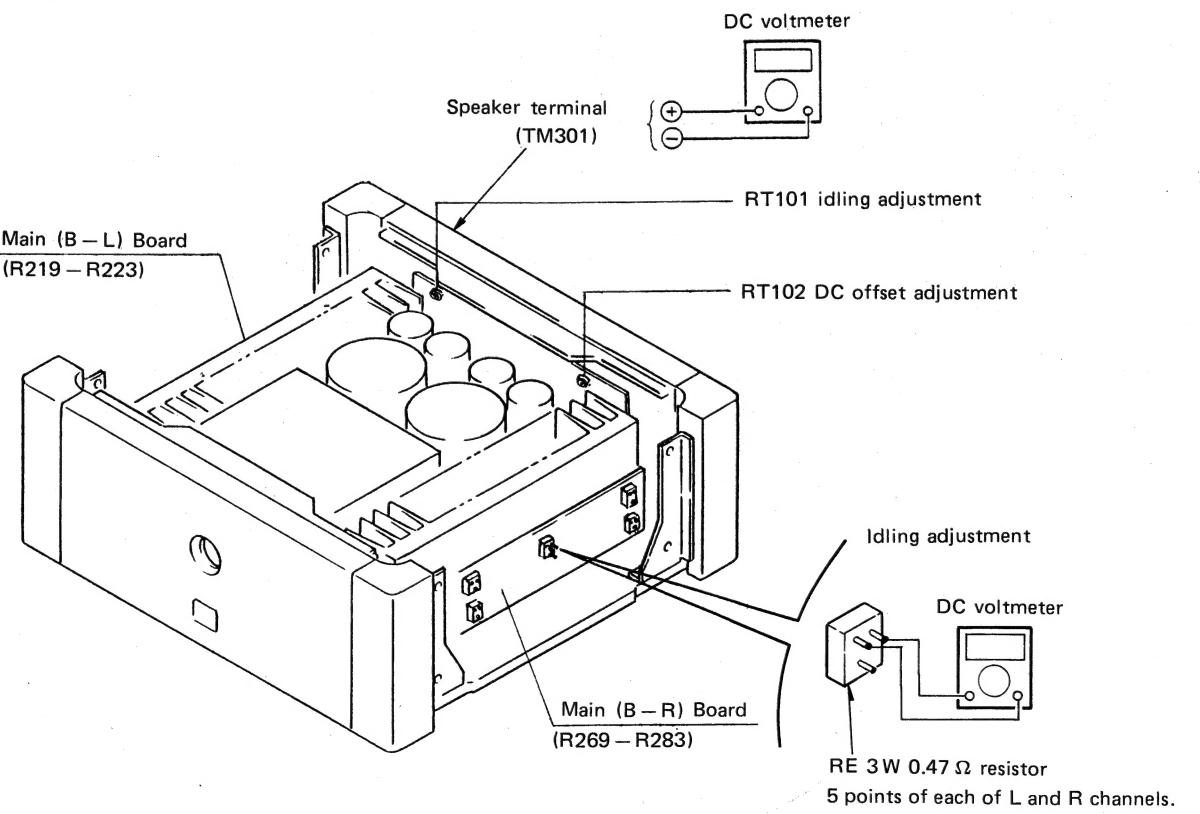
1. Connect a DC voltmeter (digital voltmeter) to respective leads of R219 to R223 and R269 to R283, and measure the voltage across each resistor.
2. Adjust RT101 so that the average of voltages at the above 10 places will be 0.15 V ( $\pm 0.02$  V).

### [ DC OFFSET ADJUSTMENT ]

#### Procedure:

1. Connect the DC voltmeter to both terminals of the SP terminal (TM301), and adjust RT102 so that the indication of the DC voltmeter will become 0 V.

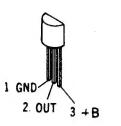
### Adjustment positions:



## 4-1. SEMICONDUCTOR LEAD LAYOUTS

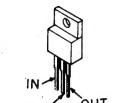
LM35DZ

2SA1216  
2SC2922



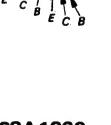
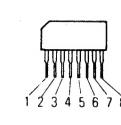
M5F78M12

2SA1349-GR-BL



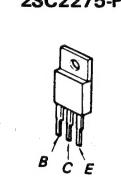
μPC1237HA

2SA1360  
2SC3423

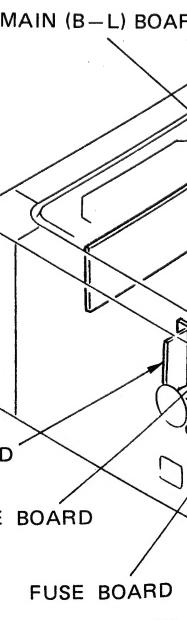


2SA985A-QP  
2SC2275-P

2SA985A-QP  
2SC2275-P

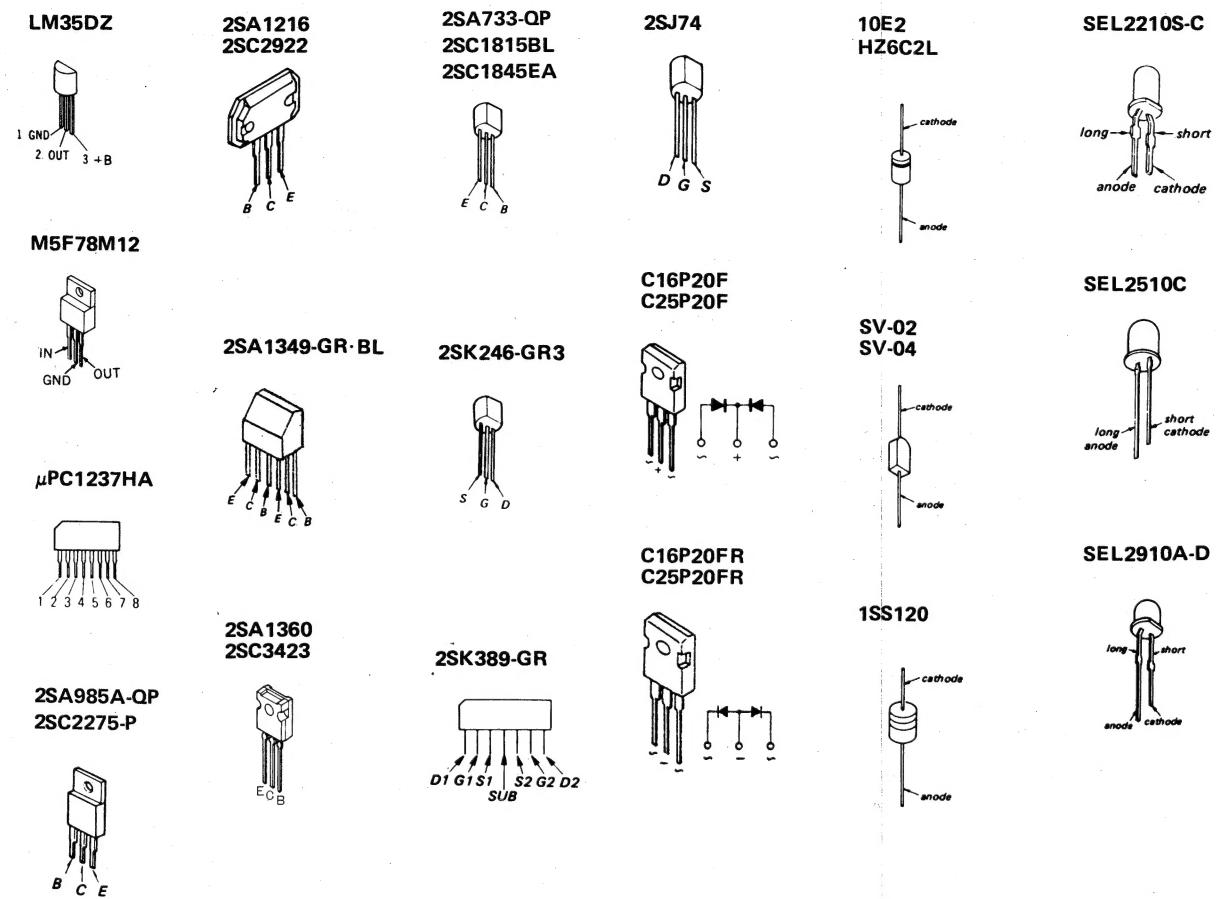


## 4-2. CIRCUIT BOARDS LOCATION

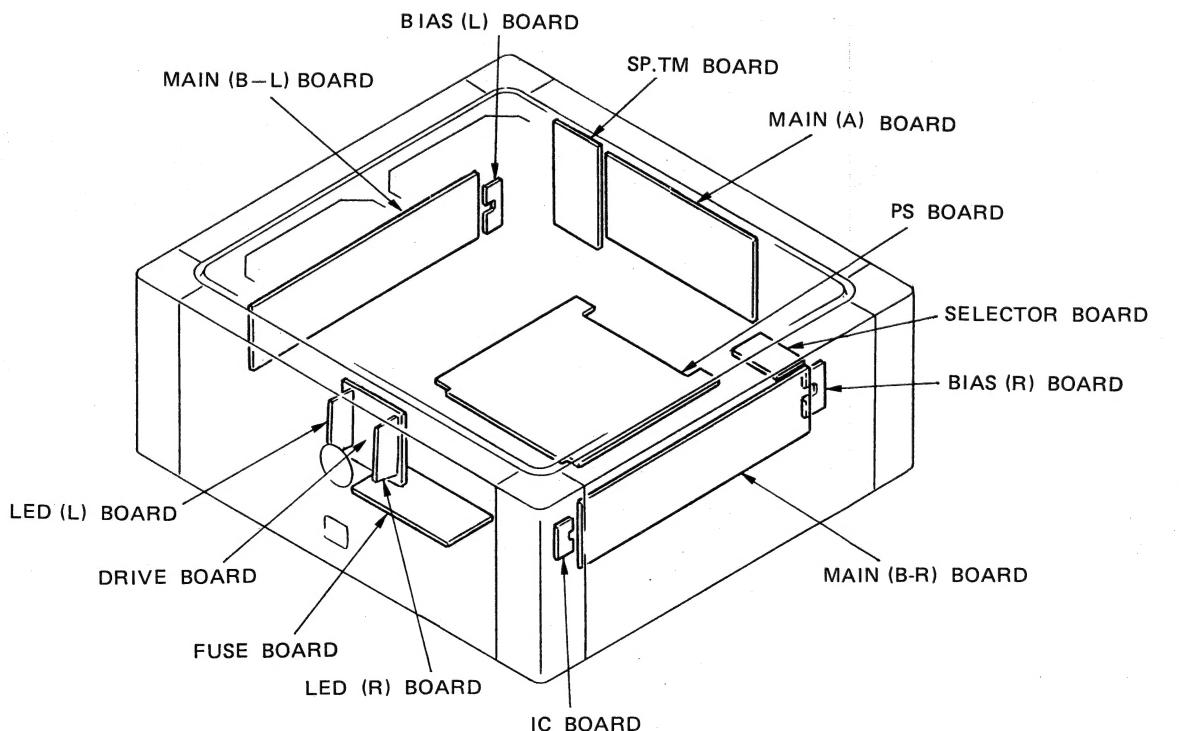


## SECTION 4 DIAGRAMS

### 4-1. SEMICONDUCTOR LEAD LAYOUTS



### 4-2. CIRCUIT BOARDS LOCATION



Idling adjustment

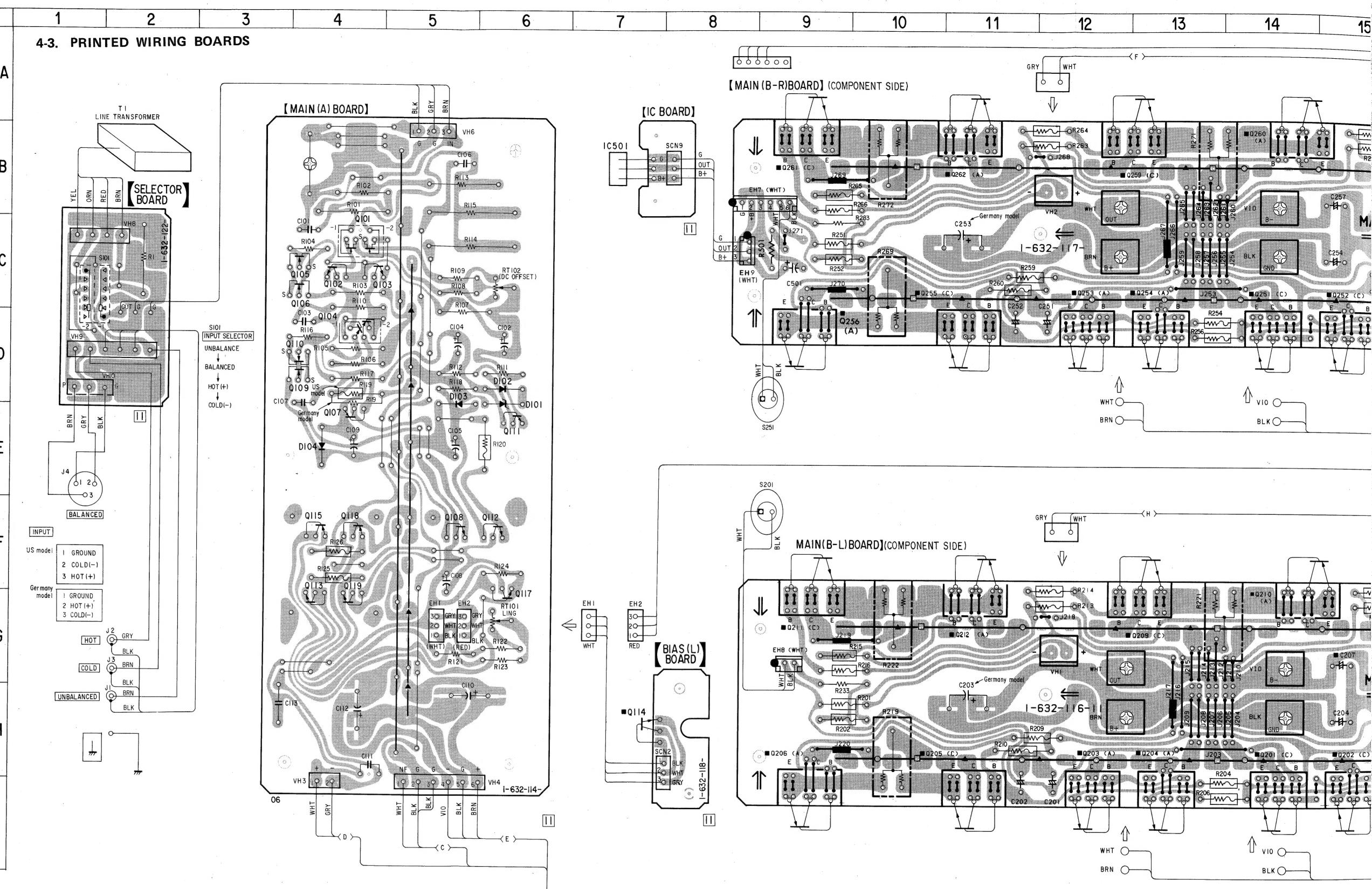
C offset adjustment

Idling adjustment

DC voltmeter

RE 3W 0.47 Ω resistor

points of each of L and R channels.

**Note:**

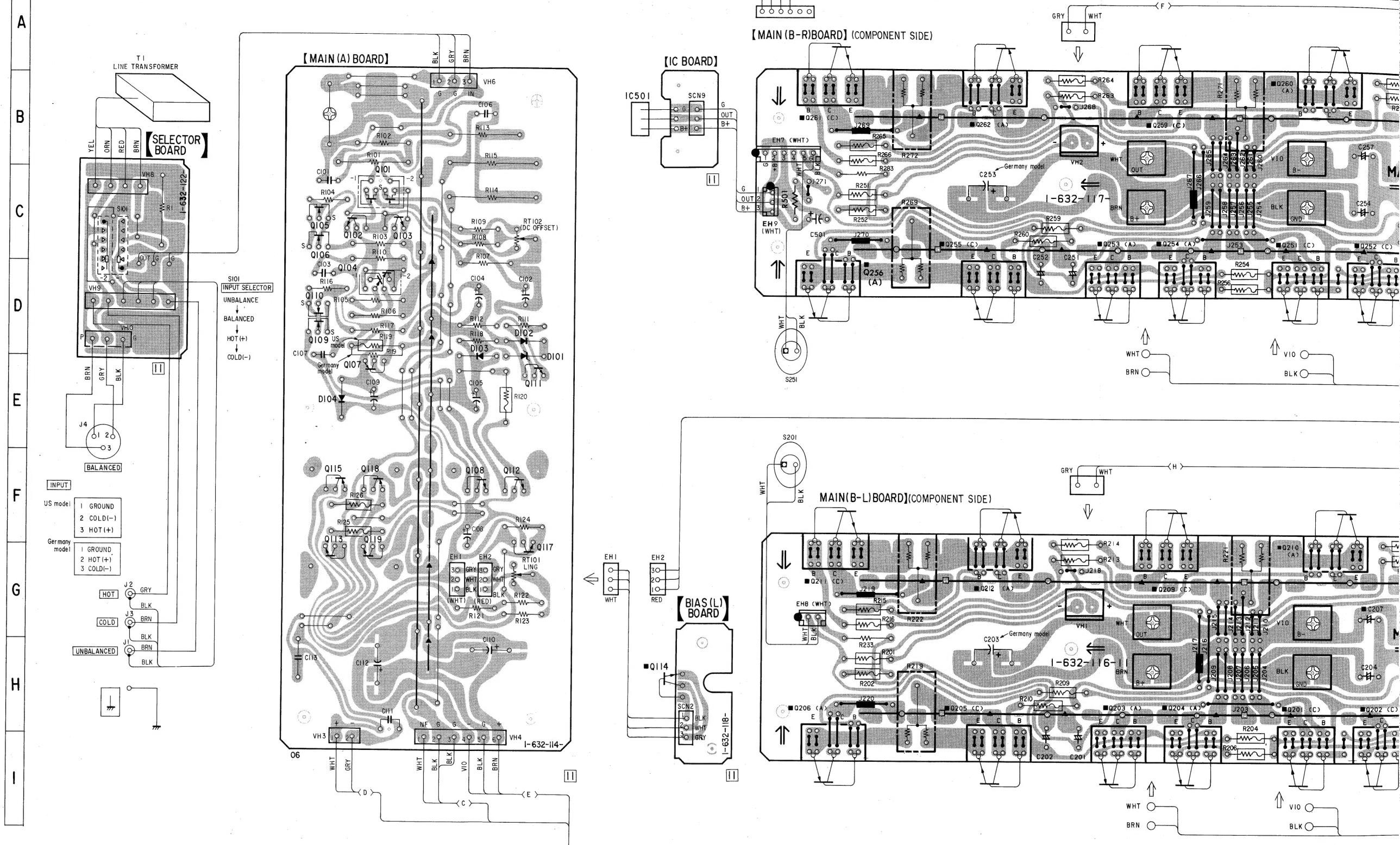
- : parts extracted from the component side.
- : Bus bar in use with the mark.

▲ : B +

○ : B -

□ : CENTER VOLTAGE (OUTPUT)

#### 4-3. PRINTED WIRING BOARDS



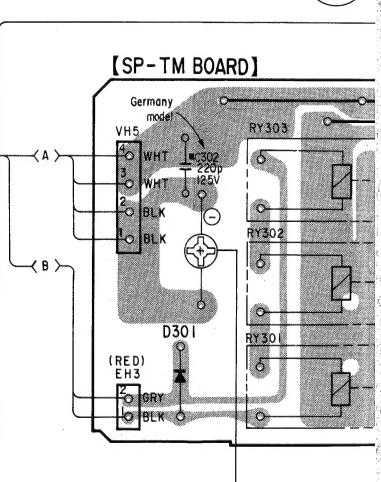
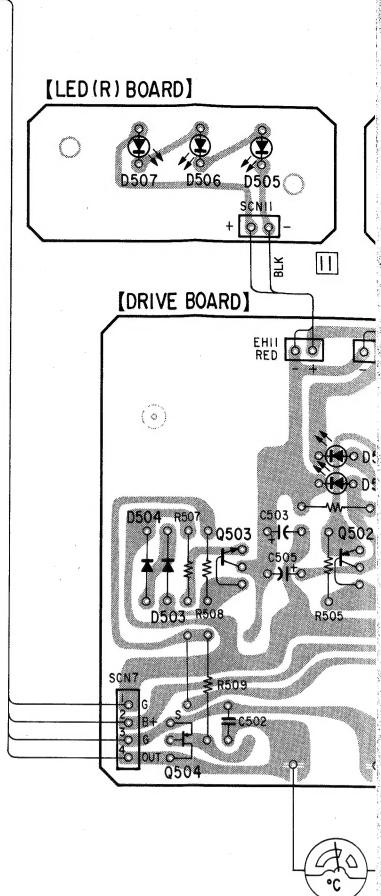
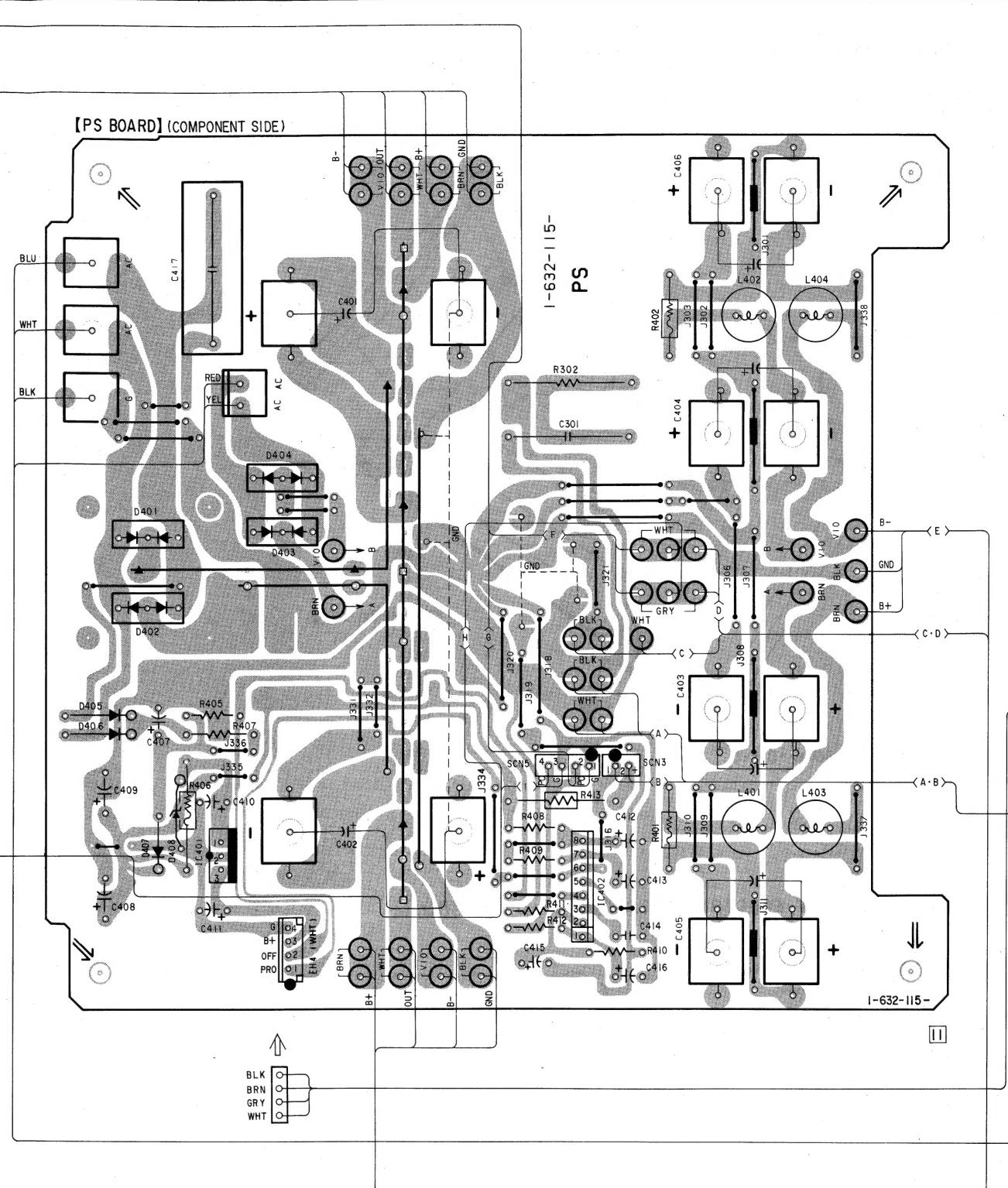
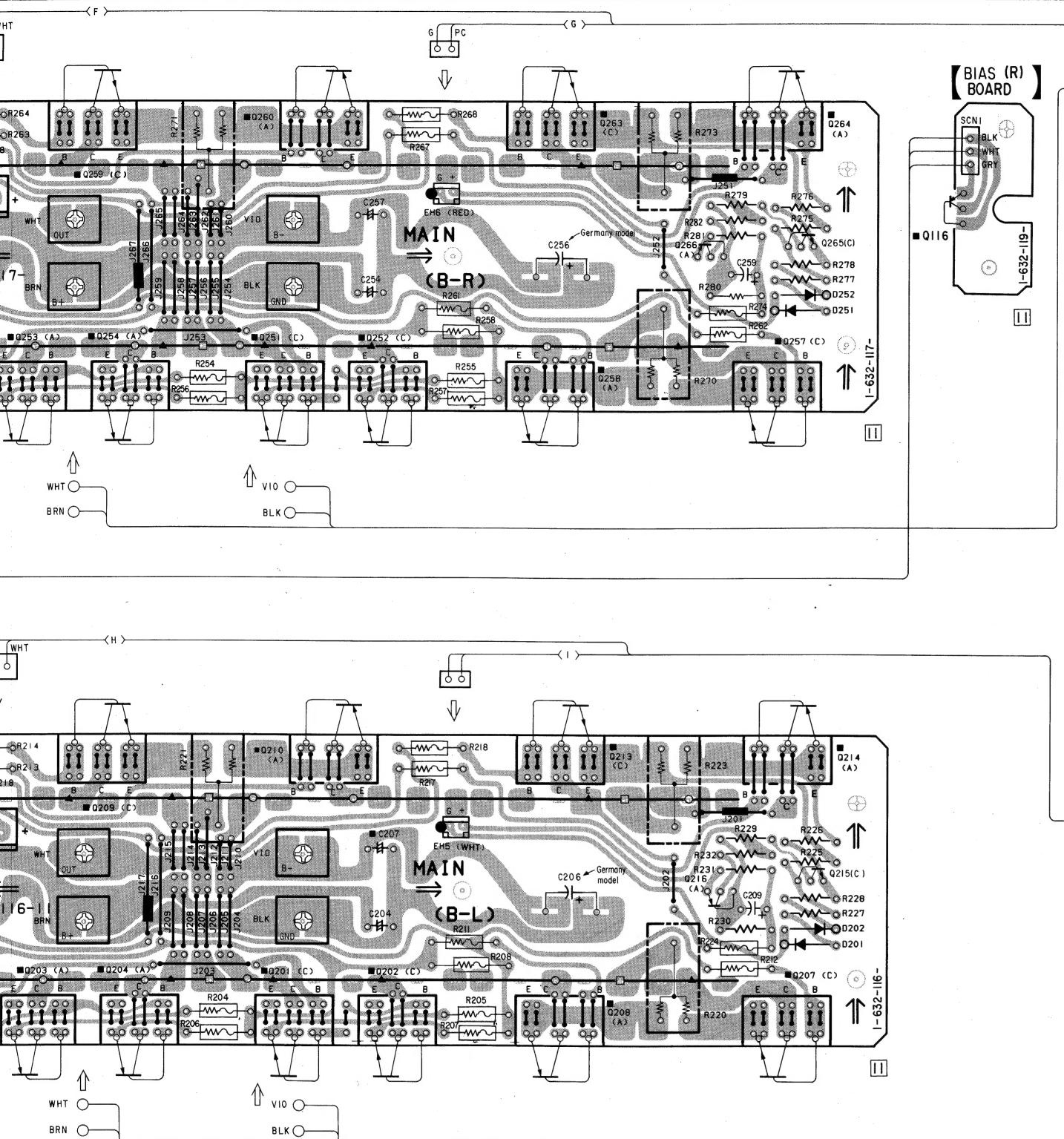
**Note:**

- ○— : parts extracted from the component side.
- Bus bar in use with the mark.

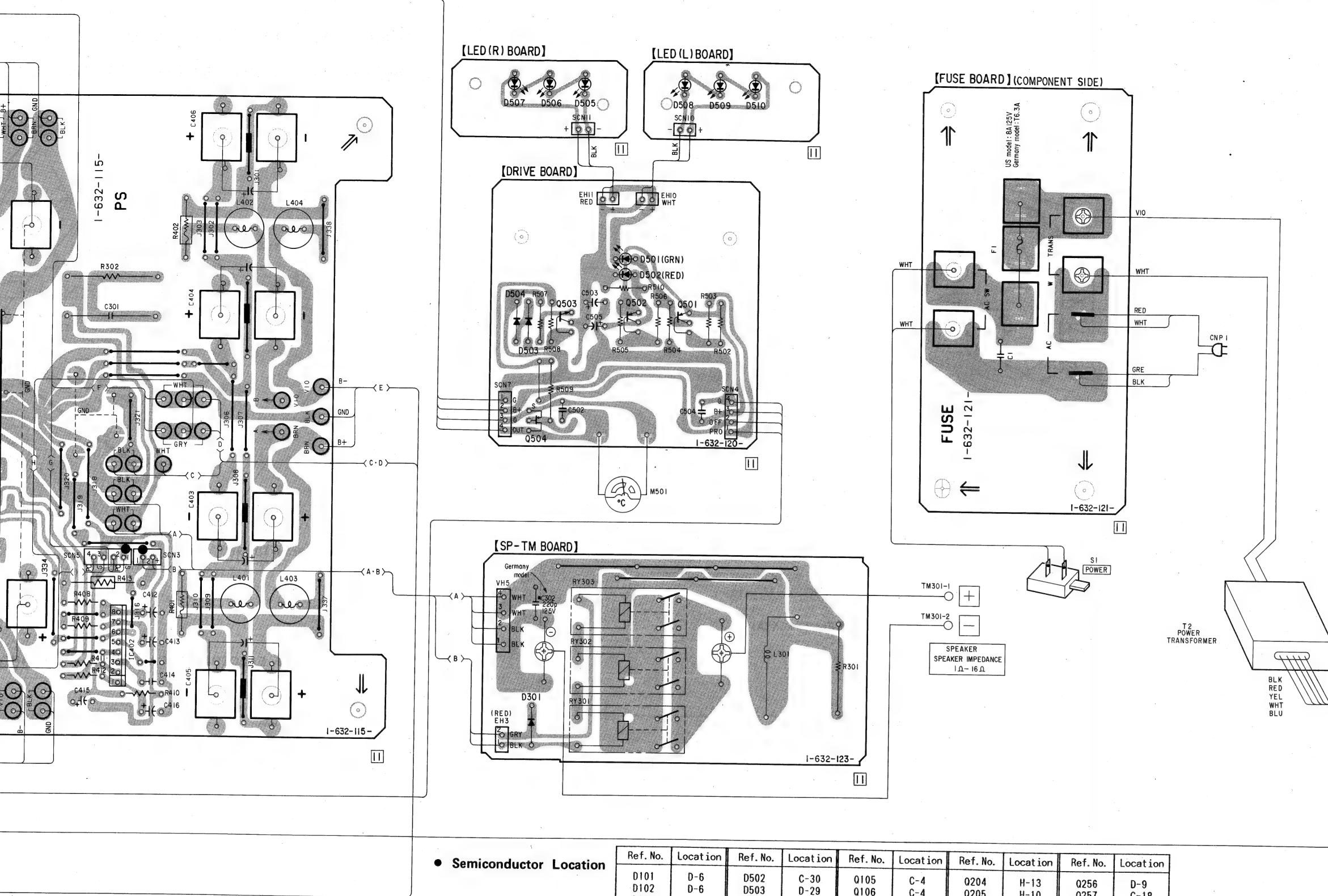
▲ : B +

○ : B -

: CENTER VOLTAGE (OUTPUT)



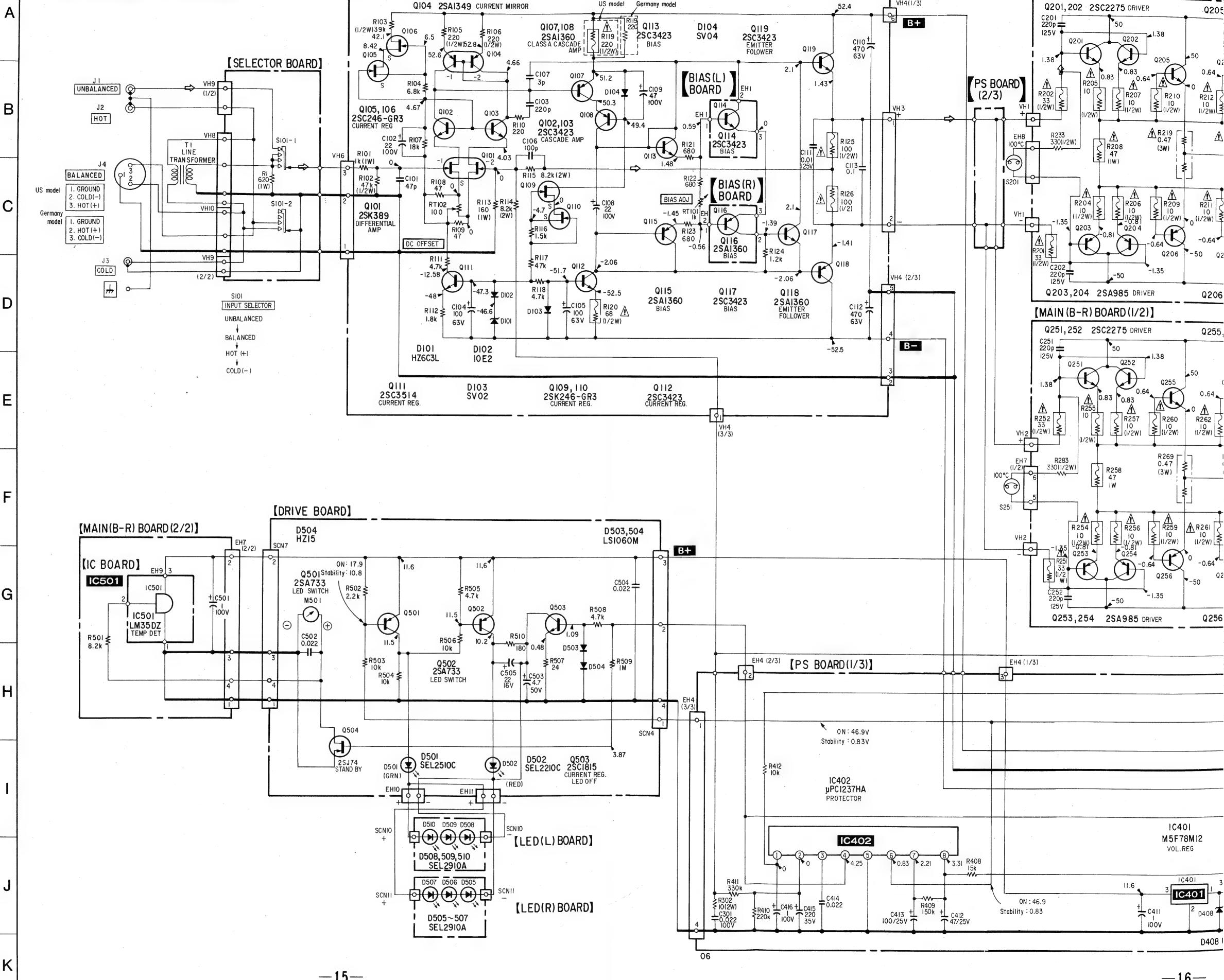
#### ● Semiconductor Location



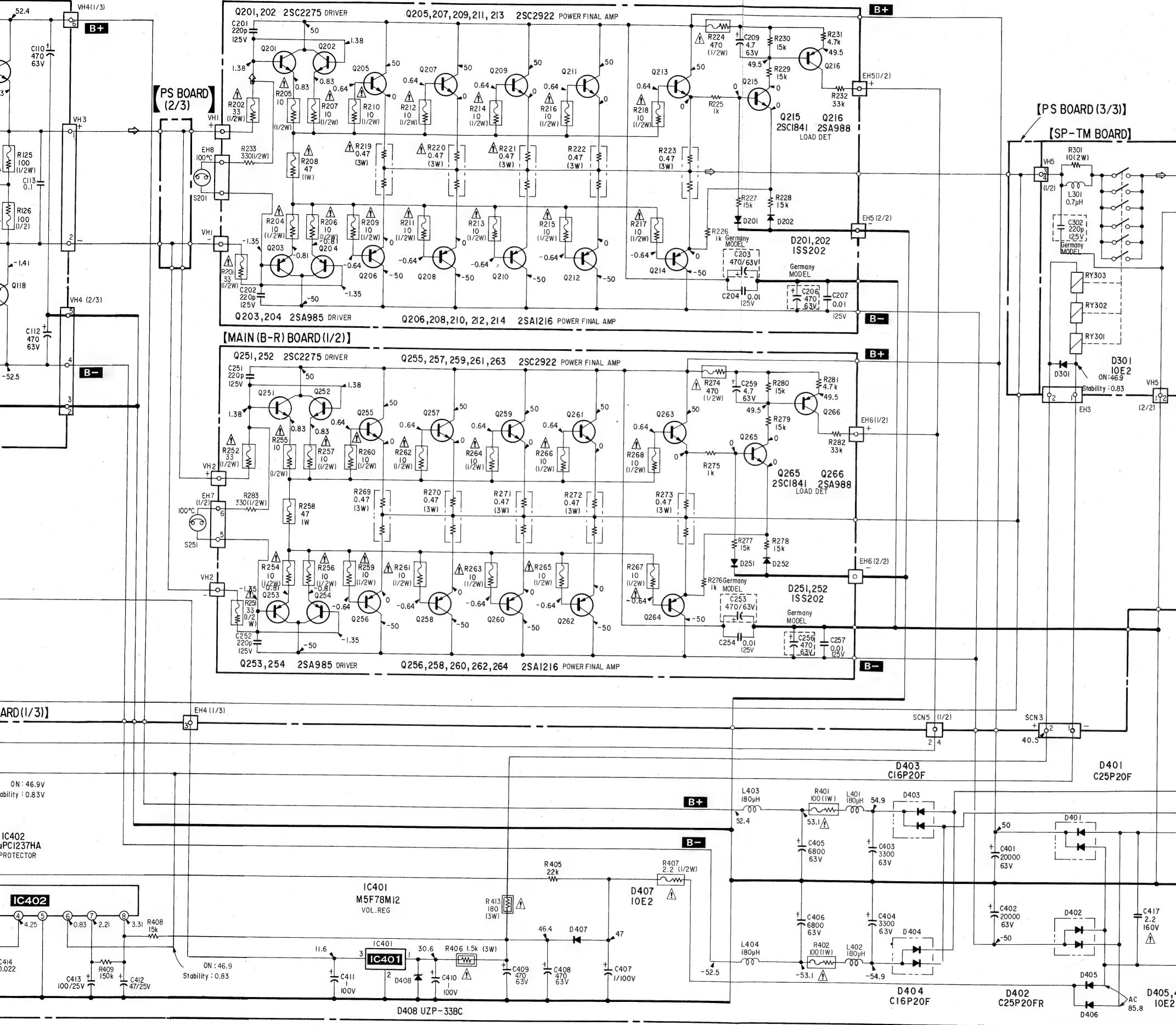
● Semiconductor Location

Ref. No.	Location	Ref. No.	Location	Ref. No.	Location	Ref. No.	Location	Ref. No.	Location
D101	D-6	D502	C-30	Q105	C-4	Q204	H-13	Q256	D-9
D102	D-6	D503	D-29	Q106	C-4	Q205	H-10	Q257	C-18
D103	D-5	D504	D-28	Q107	E-4	Q206	H-9	Q258	D-17
D104	E-4	D505	B-29	Q108	F-5	Q207	H-18	Q259	B-13
D201	H-18	D506	B-29	Q109	D-4	Q208	H-18	Q260	B-14
D202	H-18	D507	B-28	Q110	D-4	Q209	G-13	Q261	B-9
D251	C-18	D508	B-30	Q111	E-6	Q210	F-14	Q262	B-11
D252	C-18	D509	B-30	Q112	F-6	Q211	G-9	Q263	B-17
D301	H-29	D510	B-31	Q113	F-4	Q212	G-11	Q264	B-18
D401	D-21			Q114	H-7	Q213	G-17	Q265	C-18
D402	E-21	IC401	G-22	Q115	F-4	Q214	G-18	Q266	C-17
D403	E-22	IC402	G-25	Q116	B-19	Q215	G-18	Q501	D-30
D404	D-22	IC501	B-7	Q117	G-6	Q216	G-17	Q502	D-30
D405	F-21			Q118	F-4	Q251	C-14	Q503	D-29
D406	F-21	Q101	C-4	Q119	F-4	Q252	C-15	Q504	E-29
D407	G-21	Q102	C-4	Q201	H-14	Q253	C-12		
D408	G-21	Q103	C-4	Q202	H-15	Q254	C-13		
D501	C-30	Q104	D-4	Q203	H-12	Q255	C-10		

## 4-4. SCHEMATIC DIAGRAM



## 【MAIN (B-L) BOARD】



## SECTION 5 EXPLODED VIEWS

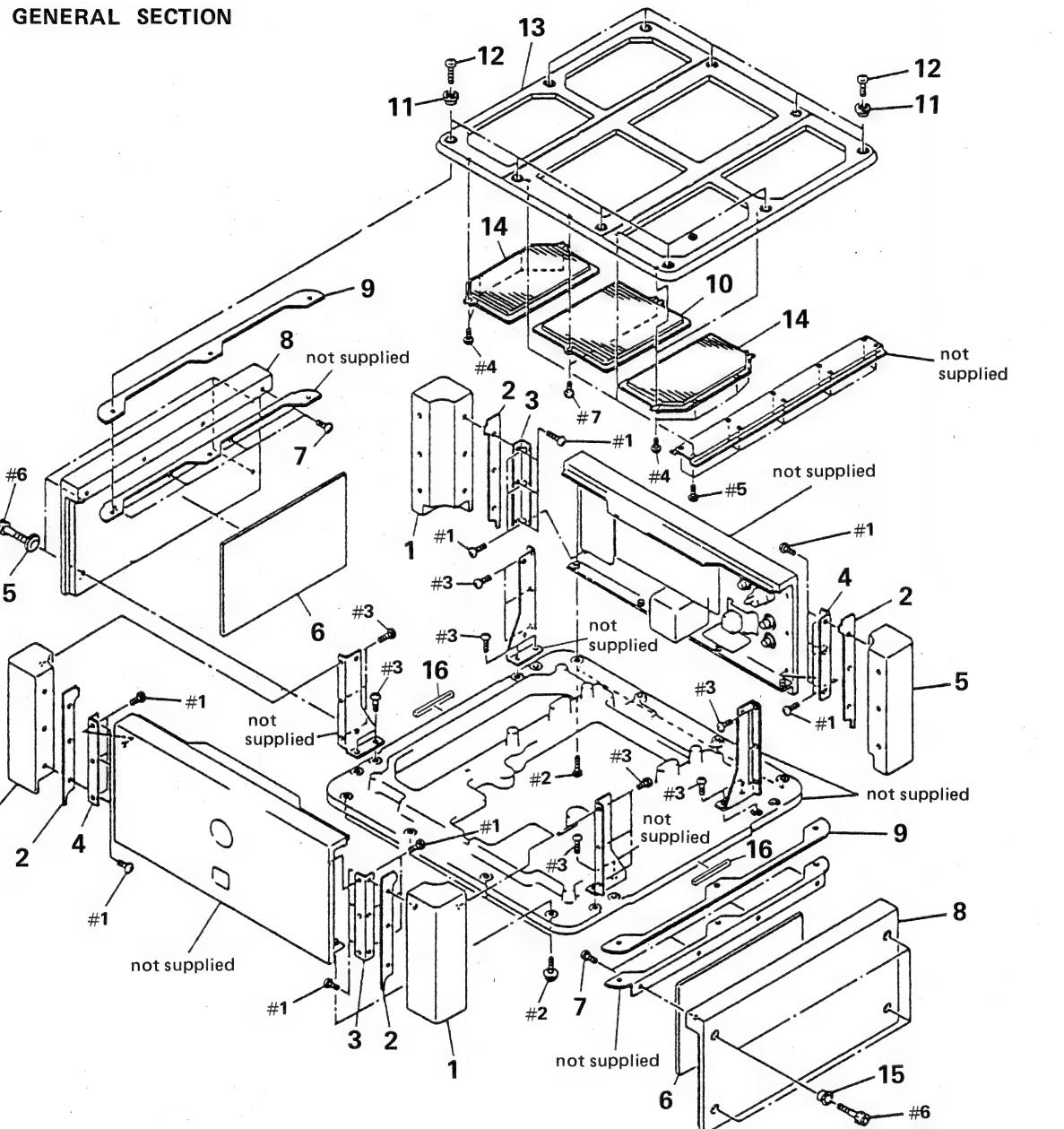
## NOTE:

- -XX, -X mean standardized parts, so they may have some differences from the original one.
- Color Indication of Appearance Parts  
Example:  
KNOB, BALANCE (WHITE)...(RED)  
↑   ↑  
Parts color                                   Cabinet's color

- Items marked "\*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- The mechanical parts with no reference number in the exploded views are not supplied.
- Hardware (# mark) list is given in the last of this parts list.

The components identified by mark or dotted line with mark are critical for safety. Replace only with part number specified.

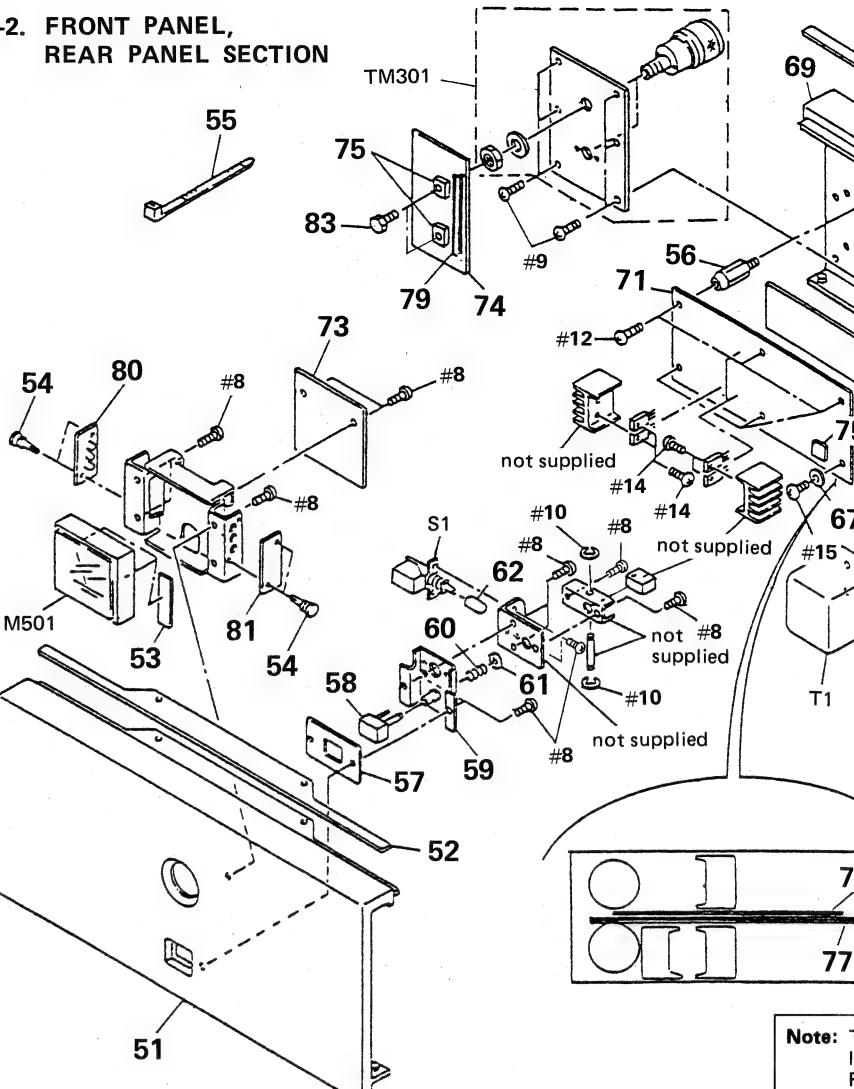
## 5-1. GENERAL SECTION



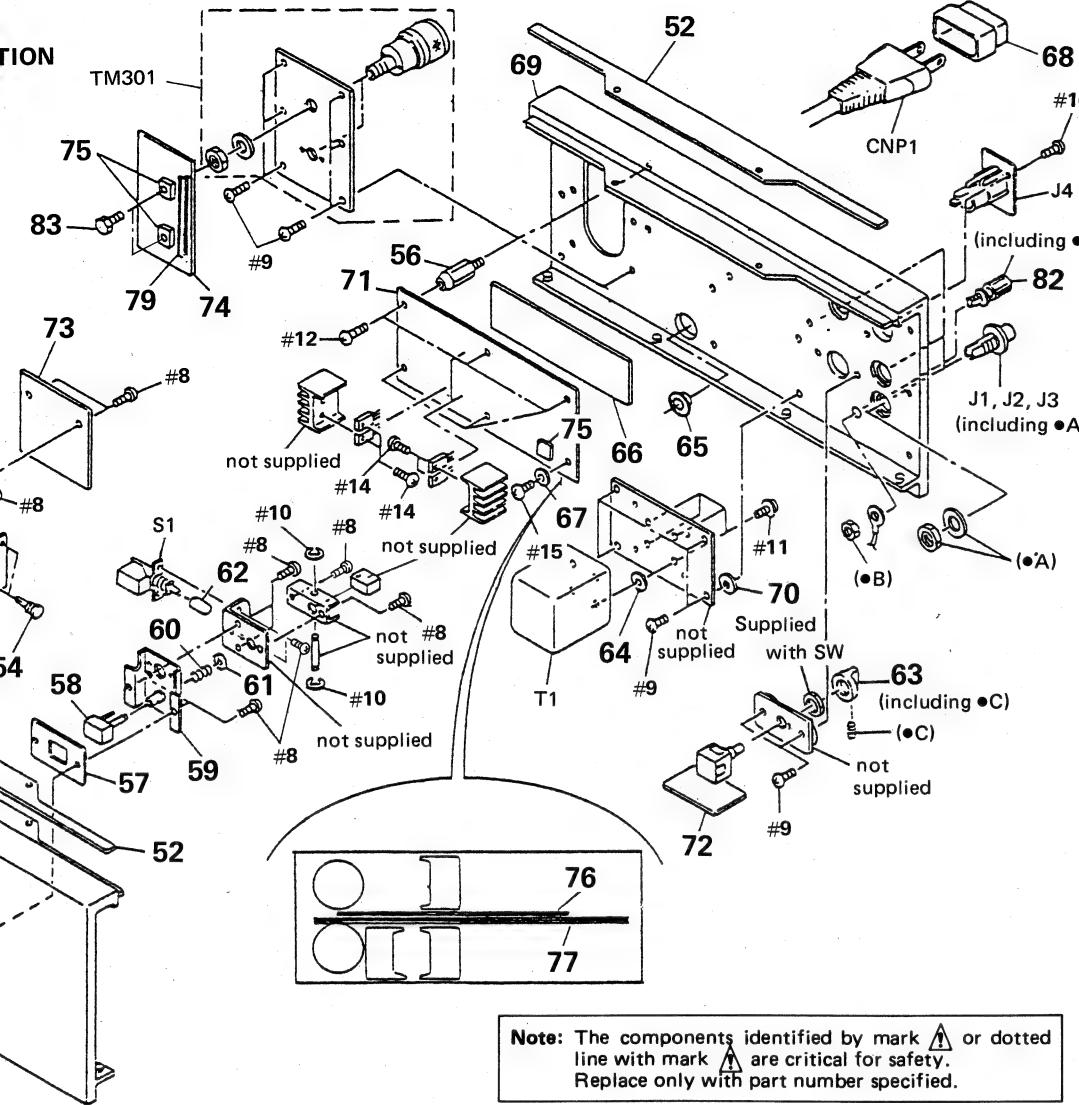
Ref. No.	Part No.	Description	Remark
1	4-935-237-01	PANEL (RIGHT), SIDE	
2	4-935-201-01	SPACER	
3	4-935-203-01	BRACKET (RIGHT)	
4	4-935-202-01	BRACKET (LEFT)	
5	4-935-236-01	PANEL (LEFT), SIDE	
6	9-911-851-XX	ABSORBENT, ACOUSTIC	
7	4-874-614-11	SCREW (4) (3.5X14), TAPPING	
8	X-4935-204-1	PLATE ASSY, SIDE, ORNAMENTAL	
9	4-935-232-01	PACKING (A), TOP PLATE (Germany)	
9	4-935-232-11	PACKING (A), TOP PLATE (US)	

Ref. No.	Part No.	Description	Remark
10	4-935-228-01	GRILLE (A)	
11	4-924-237-01	ESCUTCHEON (A)	
12	4-924-242-21	SCREW (M3X10), FLAT HEAD	
13	4-935-242-01	PLATE (A), TOP	
14	4-935-229-01	GRILLE (B)	
15	4-924-241-01	ESCUTCHEON (B)	
16	9-911-840-XX	CUSHION	

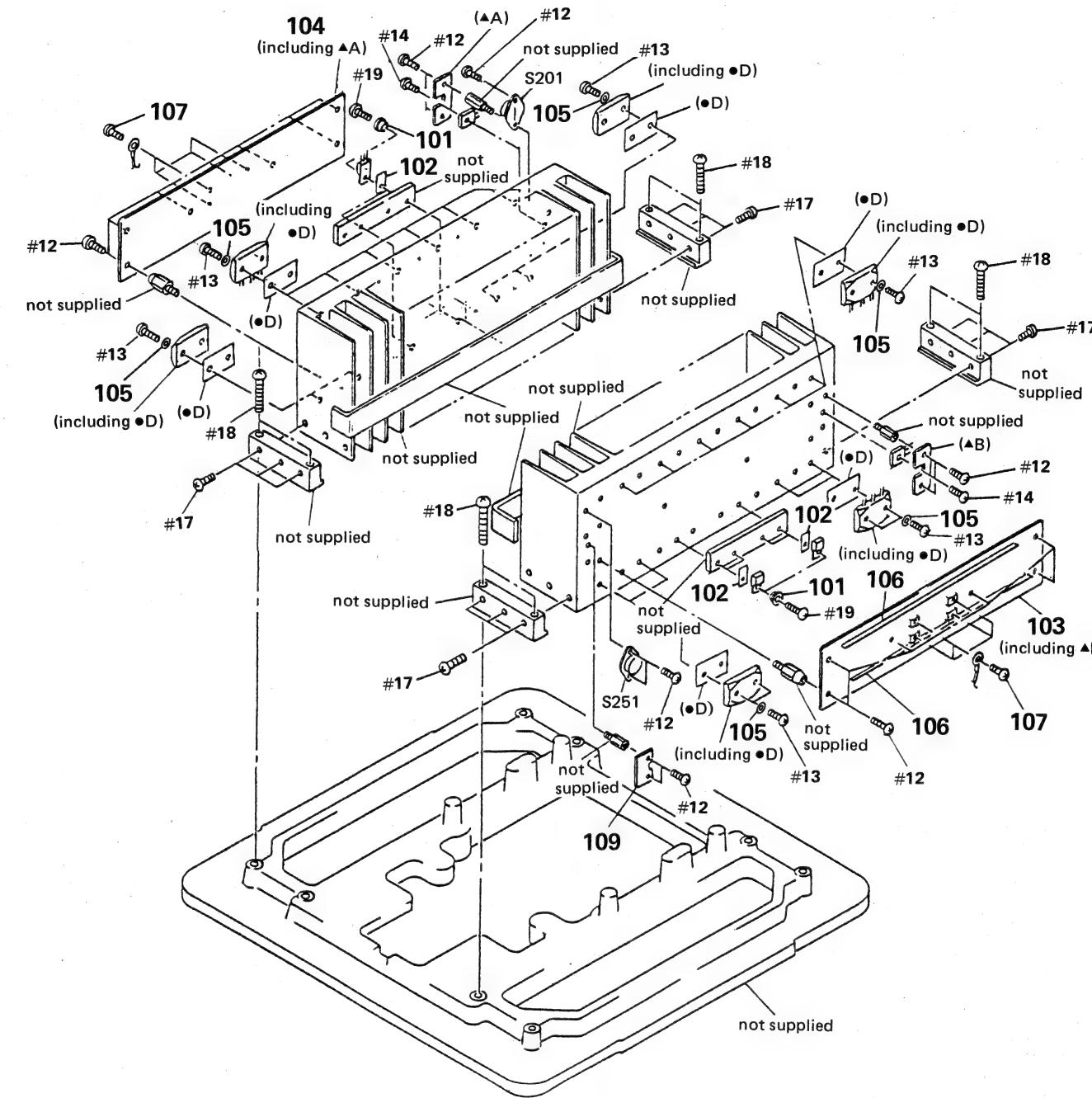
## 5-2. FRONT PANEL, REAR PANEL SECTION



Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
51	4-935-234-01	PANEL, FRONT		71	* A-4345-3		
52	4-935-233-01	PACKING (B), TOP PLATE (Germany)		71	* A-4345-3		
52	4-935-233-11	PACKING (B), TOP PLATE (US)		72	* 1-632-12		
53	9-911-844-XX	CUSHION, GRILLE		73	* 1-632-12		
54	4-812-134-00	RIVET NYLON, 3.5		74	* 1-632-12		
55	3-655-653-21	BAND (TAITON), BINDING		75	* 4-835-63		
56	* 4-935-216-01	BOSS		76	1-564-29		
57	4-924-245-01	PLATE (E), ORNAMENTAL		77	* 1-564-39		
58	X-4935-201-1	BUTTON ASSY		78	* 1-560-24		
59	* X-4924-202-1	BRACKET (E) ASSY		79	* 1-560-24		
60	* 4-880-426-00	SPRING, COMPRESSION		80	* 1-633-16		
61	4-862-338-00	RING, STOPPER		81	* 1-633-16		
62	4-935-221-01	CAP		82	* 4-935-25		
63	4-924-256-01	KNOB (B)		83	* 4-931-96		
64	4-885-984-21	WASHER		CNP1	△ 1-559-47		
65	* 4-946-389-01	ESCUTCHEON, CORD		CNP1	△ 1-559-27		
66	9-911-851-XX	ABSORBENT, ACOUSTIC		J1	1-568-91		
67	4-908-961-11	WASHER		J2	1-568-91		
68	4-362-304-00	GUARD, PLUG (US)		J3	1-568-91		
69	* 4-935-235-21	PANEL, BACK (Germany)		J4	1-568-91		
69	* 4-935-235-11	PANEL, BACK (US)		M501	1-520-50		
70	4-916-751-01	WASHER		S1	1-554-53		
				T1	1-424-29		
				TM301	1-537-24		



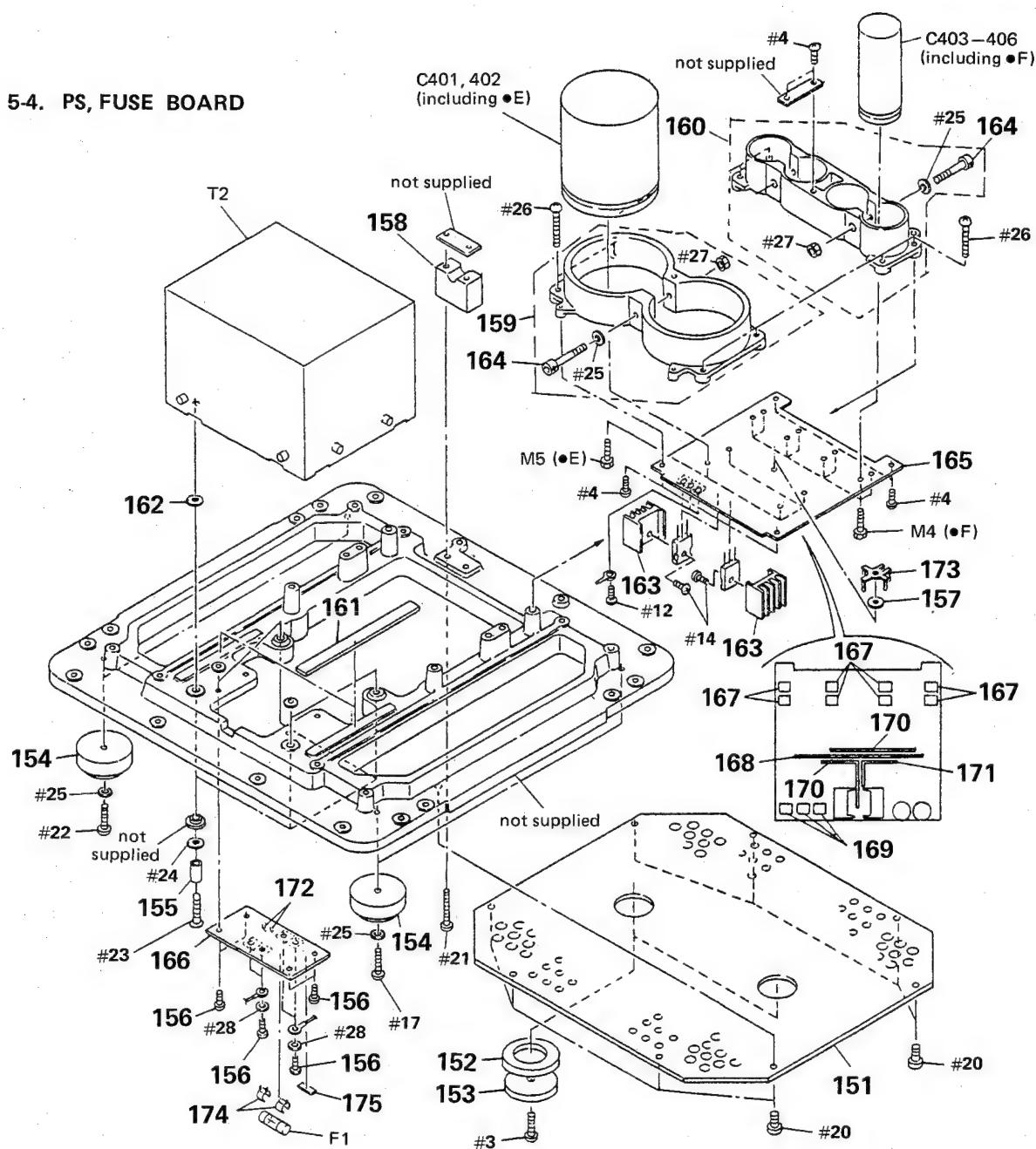
### 5-3. HEAT SINK SECTION



Description	Remark	Ref. No.	Part No.	Description	Remark
PANEL, FRONT		71	* A-4345-337-A	MAIN (A) BOARD, COMPLETE (US)	
PACKING (B), TOP PLATE (Germany)		71	* A-4345-353-A	MAIN (A) BOARD, COMPLETE (Germany)	
PACKING (B), TOP PLATE (US)		72	* 1-632-122-11	SELECTOR BOARD	
CUSHION, GRILLE		73	* 1-632-120-11	DRIVE BOARD	
RIVET NYLON, 3.5		74	* 1-632-123-11	SP. TM BOARD	
BAND (TAITON), BINDING		75	* 4-835-639-00	PLATE, GROUND	
BOSS		76	1-564-295-00	BAR, BUS	
PLATE (E), ORNAMENTAL		77	* 1-564-393-00	BUS BAR 9P	
BUTTON ASSY		78	* 1-560-242-21	BUS BAR 4P	
BRACKET (E) ASSY		79	* 1-560-242-11	BUS BAR 3P	
SPRING, COMPRESSION		80	* 1-633-166-11	LED (L) BOARD	
RING, STOPPER		81	* 1-633-167-11	LED (R) BOARD	
CAP		82	* 4-935-253-01	TERMINAL, SP	
		83	* 4-931-964-01	SCREW (M4X6)	
KNOB (B)		CNP1	▲ 1-559-479-11	CORD, POWER (US)	
WASHER		CNP1	▲ 1-559-271-11	CORD, POWER (Germany)	
ESCUtCHEON, CORD		J1	1-568-918-11	JACK, PIN 1P (UNBALANCED)	
ABSORBENT, ACOUSTIC		J2	1-568-918-11	JACK, PIN 1P (HOT)	
WASHER		J3	1-568-918-11	JACK, PIN 1P (COLD)	
GUARD, PLUG (US)		J4	1-568-917-11	CONNECTOR, CANON (SOCKET) 3P (BALANCE)	
PANEL, BACK (Germany)		M501	1-520-507-11	METER	
PANEL, BACK (US)		S1	1-554-538-00	SWITCH, PUSH (AC POWER) (1 KEY) (POWER)	
WASHER		T1	1-424-299-11	TRANSFORMER, LINE	
		TM301	1-537-248-11	TERMINAL BORAD (SPEAKER 2P)	

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
101	2-371-561-00	BUSHING (P), INSULATING		105	4-908-961-01	WASHER	
102	4-916-721-01	SHEET, INSULATING		106	1-565-063-11	BAR, BUS	
103	* A-4345-340-A	MAIN (B-R) BOARD, COMPLETE (US)		107	* 4-931-964-01	SCREW (M4X6)	
103	* A-4345-355-A	MAIN (B-R) BOARD, COMPLETE (Germany)		109	* 1-633-170-11	IC BOARD	
104	* A-4345-339-A	MAIN (B-L) BOARD, COMPLETE (US)		S201	1-576-080-11	THERMOSTAT	
104	* A-4345-354-A	MAIN (B-L) BOARD, COMPLETE (Germany)		S251	1-576-080-11	THERMOSTAT	

## 5-4. PS, FUSE BOARD



Ref. No.	Part No.	Description
151	4-935-240-01	BOARD, BOTTOM
152	4-935-250-11	WASHER
153	4-935-252-01	WASHER
154	X-4924-207-1	FOOT ASSY
155	* 2-640-757-01	SPACER
156	* 4-931-964-01	SCREW (M4X6)
157	* 3-555-872-21	SPACER
158	* 4-946-387-01	STOPPER, CORD
159	* X-4935-205-1	HOLDER (A) ASSY
160	* X-4935-206-1	HOLDER (B) ASSY
161	* 4-935-249-01	ABSORBENT, VIBRATION
162	4-935-250-01	WASHER
163	* 4-921-402-01	HEAT SINK
164	4-946-777-01	BOLT (C4X55), HEXAGON SOCKET
165	* A-4345-075-A	PS BOARD, COMPLETE (Germany)
165	* A-4345-338-A	PS BOARD, COMPLETE (US)
166	* 1-632-121-11	FUSE BOARD
167	* 4-835-639-00	PLATE, GROUND
168	1-564-295-00	BAR, BUS
170	* 1-560-242-31	BUS BAR 4P

Ref. No.	Part No.	Description
171	* 1-560-242-21	BUS BAR 4P
172	1-535-476-11	TERMINAL
173	* 4-916-791-01	PLATE, GROUND 5P
174	* 1-533-185-11	HOLDER, FUSE (US)
174	1-533-183-11	HOLDER, FUSE (Germany)
175	3-701-947-19	LABEL (T6.3A), FUSE (Germany)
C401	1-125-583-11	CAP, ELECT 2000MF 63V
C402	1-125-583-11	CAP, ELECT 2000MF 63V
C403	1-125-597-11	CAP, ELECT 3300MF 63V
C404	1-125-597-11	CAP, ELECT 3300MF 63V
C405	1-125-581-11	CAP, ELECT 6800MF 63V
C406	1-125-581-11	CAP, ELECT 6800MF 63V
F1	▲ 1-532-510-00	FUSE, GLASS TUBE (8.0A) (US)
F1	▲ 1-532-325-00	FUSE, TIME-LAG (6.3A) (Germany)
T2	▲ 1-450-490-11	TRANSFORMER, POWER (US)
T2	▲ 1-450-491-11	TRANSFORMER, POWER (Germany)

**Note:** The components identified by mark ▲ or dotted line with mark ▲ are critical for safety. Replace only with part number specified.

MAIN(A)

PS

BIAS (L)

BIAS (R)

## SECTION 6

### ELECTRICAL PARTS LIST

**NOTE:**

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX, -X mean standardized parts, so they may have some difference from the original one.
- RESISTORS

All resistors are in ohms

METAL: Metal-film resistor

METAL OXIDE: Metal Oxide-film resistor

F: nonflammable

- Items marked "\*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

## • SEMICONDUCTORS

In each case, u:  $\mu$ , for example:  
 uA...:  $\mu$ A..., uPA...:  $\mu$ PA...,  
 uPB...:  $\mu$ PB..., uPC...:  $\mu$ PC...,  
 uPD...:  $\mu$ PD...

## • CAPACITORS

uF:  $\mu$ F

## • COILS

uH:  $\mu$ H

The components identified by mark  or dotted line with mark  are critical for safety. Replace only with part number specified.

When indicating parts by reference number, please include the board name.

Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark
	* A-4345-337-A	MAIN (A) BOARD, COMPLETE (US)		C402	1-125-583-11	CAP. ELECT	2000MF 63V
	* A-4345-353-A	MAIN (A) BOARD, COMPLETE (Germany)		C403	1-125-597-11	CAP. ELECT	3300MF 63V
		*****		C404	1-125-597-11	CAP. ELECT	3300MF 63V
	* A-4345-075-A	PS BOARD, COMPLETE (Germany)		C405	1-125-581-11	CAP. ELECT	6800MF 63V
	* A-4345-338-A	PS BOARD, COMPLETE (US)		C406	1-125-581-11	CAP. ELECT	6800MF 63V
		*****		C407	1-123-380-00	ELECT	1uF 20% 100V
	1-535-730-21	LEAD, JUMPER (OFC)		C408	1-126-066-11	ELECT	470uF 20% 63V
	1-535-731-21	LEAD, JUMPER (OFC)		C409	1-126-066-11	ELECT	470uF 20% 63V
	* 1-560-242-21	BUS BAR 4P		C410	1-123-380-00	ELECT	1uF 20% 100V
	* 1-560-242-31	BUS BAR 5P		C411	1-123-380-00	ELECT	1uF 20% 100V
	1-564-295-00	BAR, BUS		C412	1-124-910-11	ELECT	47uF 20% 50V
	* 1-564-393-00	BUS BAR 9P		C413	1-124-122-11	ELECT	100uF 20% 50V
	* 3-555-872-21	SPACER		C414	1-136-157-00	FILM	0.022uF 5% 50V
	* 4-835-639-00	PLATE, GROUND		C415	1-124-484-11	ELECT	220uF 20% 35V
	* 4-916-791-01	PLATE, GROUND, 5P		C416	1-123-380-00	ELECT	1uF 20% 100V
	* 4-921-402-01	HEAT SINK		C417	△ 1-136-880-11	FILM	2.2uF 10% 160V
	7-682-148-15	SCREW, TR					

## &lt; DIODE &gt;

< CAPACITOR >					
C101	1-104-322-11	POLYSTYRENE	47PF	10%	400V
C102	1-124-748-11	ELECT	22uF	20%	100V
C103	1-104-233-00	POLYSTYRENE	220PF	10%	125V
C104	1-124-130-00	ELECT	100uF	20%	63V
C105	1-124-130-00	ELECT	100uF	20%	63V
C106	1-104-269-11	POLYSTYRENE	100PF	10%	125V
C107	1-104-320-11	POLYSTYRENE	3PF	10%	400V
C108	1-124-748-11	ELECT	22uF	20%	100V
C109	1-126-988-11	ELECT	47uF	20%	100V
C110	1-125-580-11	ELECT	470uF	20%	63V
C111	1-104-319-11	POLYSTYRENE	10000PF	10%	125V
C112	1-125-580-11	ELECT	470uF	20%	63V
C113	1-130-321-00	FILM	0.1uF	5%	100V
C301	1-136-944-11	FILM	0.022uF	5%	0
C401	1-125-583-11	CAP. ELECT	20000MF		63V

## &lt; CONNECTOR &gt;

EH1	* 1-564-506-11	PLUG, CONNECTOR 3P
EH2	* 1-564-506-11	PLUG, CONNECTOR 3P
EH4	* 1-564-507-11	PLUG, CONNECTOR 4P

MAIN(A)	PS	BIAS (L)	BIAS (R)
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Ref. No.	Part No.	Description	Remark	Ref. No.	Part No.	Description	Remark				
< IC >											
IC401	8-759-604-39	IC M5F78M12		Q254	8-729-141-10	TRANSISTOR 2SA985A-QP					
IC402	8-759-111-68	IC uPC1237HA		Q255	8-729-300-11	TRANSISTOR 2SC2922					
< COIL >											
L401	* 1-422-203-11	COIL, AIR-CORE 180uH		Q256	8-729-300-10	TRANSISTOR 2SA1216					
L402	* 1-422-203-11	COIL, AIR-CORE 180uH		Q257	8-729-300-11	TRANSISTOR 2SC2922					
L403	* 1-422-203-11	COIL, AIR-CORE 180uH		Q258	8-729-300-10	TRANSISTOR 2SA1216					
L404	* 1-422-203-11	COIL, AIR-CORE 180uH		Q259	8-729-300-11	TRANSISTOR 2SC2922					
< TRANSISTOR >											
Q101	8-729-203-21	TRANSISTOR 2SK389-GR		< RESISTOR >							
Q102	8-729-203-45	TRANSISTOR 2SC3423		R101	1-259-676-11	CARBON 1K 2% 1W					
Q103	8-729-203-45	TRANSISTOR 2SC3423		R102	1-259-595-11	CARBON 47K 1% 1/2W					
Q104	8-729-232-00	TRANSISTOR 2SA1349-GRBL		R103	1-249-711-11	CARBON 39K 5% 1/2W					
Q105	8-729-202-67	TRANSISTOR 2SK246GR3		R104	1-247-723-11	CARBON 6.8K 5% 1/4W					
Q106	8-729-202-67	TRANSISTOR 2SK246GR3		R105	1-259-539-11	CARBON 220 1% 1/2W					
Q107	8-729-209-17	TRANSISTOR 2SA1360		R106	1-259-539-11	CARBON 220 1% 1/2W					
Q108	8-729-209-17	TRANSISTOR 2SA1360		R107	1-259-585-11	CARBON 18K 1% 1/2W					
Q109	8-729-202-67	TRANSISTOR 2SK246GR3		R108	1-249-520-11	CARBON 47 5% 1/4W					
Q110	8-729-202-67	TRANSISTOR 2SK246GR3		R109	1-249-520-11	CARBON 47 5% 1/4W					
Q111	8-729-104-18	TRANSISTOR 2SC3514		R110	1-259-539-11	CARBON 220 1% 1/2W					
Q112	8-729-203-45	TRANSISTOR 2SC3423		R111	1-247-721-11	CARBON 4.7K 5% 1/4W					
Q113	8-729-203-45	TRANSISTOR 2SC3423		R112	1-247-716-11	CARBON 1.8K 5% 1/4W					
Q114	8-729-203-45	TRANSISTOR 2SC3423		R113	1-259-657-11	CARBON 160 2% 1W					
Q115	8-729-209-17	TRANSISTOR 2SA1360		R114	1-259-819-11	CARBON 8.2K 2% 2W					
Q116	8-729-209-17	TRANSISTOR 2SA1360		R115	1-259-819-11	CARBON 8.2K 2% 2W					
Q117	8-729-203-45	TRANSISTOR 2SC3423		R116	1-249-556-11	CARBON 1.5K 5% 1/4W					
Q118	8-729-209-17	TRANSISTOR 2SA1360		R117	1-249-713-11	CARBON 47K 5% 1/2W					
Q119	8-729-203-45	TRANSISTOR 2SC3423		R118	1-247-721-11	CARBON 4.7K 5% 1/4W					
Q201	8-729-127-53	TRANSISTOR 2SC2275-P		R119	1-219-030-11	FUSIBLE 220 5% 1/2W (US)					
Q202	8-729-127-53	TRANSISTOR 2SC2275-P		R119	1-259-539-11	CARBON 220 1% 1/2W (Germany)					
Q203	8-729-141-10	TRANSISTOR 2SA985A-QP		R120	▲ 1-219-018-11	FUSIBLE 68 5% 1/2W					
Q204	8-729-141-10	TRANSISTOR 2SA985A-QP		R121	1-247-711-11	CARBON 680 5% 1/4W					
Q205	8-729-300-11	TRANSISTOR 2SC2922		R122	1-247-711-11	CARBON 680 5% 1/4W					
Q206	8-729-300-10	TRANSISTOR 2SA1216		R123	1-247-711-11	CARBON 680 5% 1/4W					
Q207	8-729-300-11	TRANSISTOR 2SC2922		R124	1-247-714-11	CARBON 1.2K 5% 1/4W					
Q208	8-729-300-10	TRANSISTOR 2SA1216		R125	▲ 1-219-022-11	FUSIBLE 100 5% 1/2W					
Q209	8-729-300-11	TRANSISTOR 2SC2922		R126	▲ 1-219-022-11	FUSIBLE 100 5% 1/2W					
Q210	8-729-300-10	TRANSISTOR 2SA1216		R302	1-259-749-11	CARBON 10 2% 2W					
Q211	8-729-300-11	TRANSISTOR 2SC2922		R401	▲ 1-219-087-11	FUSIBLE 100 5% 1W					
Q212	8-729-300-10	TRANSISTOR 2SA1216		R402	▲ 1-219-087-11	FUSIBLE 100 5% 1W					
Q213	8-729-300-11	TRANSISTOR 2SC2922		R405	1-249-462-11	CARBON 22K 5% 1/4W					
Q214	8-729-300-10	TRANSISTOR 2SA1216		R406	▲ 1-215-918-00	METAL OXIDE 1.5K 5% 3W F					
Q251	8-729-127-53	TRANSISTOR 2SC2275-P		R407	▲ 1-217-981-11	FUSIBLE 2.2 5% 1/2W					
Q252	8-729-127-53	TRANSISTOR 2SC2275-P		R408	1-249-460-11	CARBON 15K 5% 1/4W					
Q253	8-729-141-10	TRANSISTOR 2SA985A-QP		R409	1-249-604-11	CARBON 150K 5% 1/4W					

Note: The components identified by mark ▲ or dotted line with mark ▲ are critical for safety. Replace only with part number specified.

MAIN(A)		PS	BIAS (L)	BIAS (R)	MAIN(B-R)		MAIN(B-L)		
DRIVE	FUSE	SELECTOR	SP.TM		LED(L)	LED(R)			
Ref. No.	Part No.	Description		Remark	Ref. No.	Part No.	Description	Remark	
R410	1-247-887-00	CARBON	220K	5%	1/4W	C253	1-125-582-11	ELECT	470uF 20% 63V (Germany)
R411	1-247-891-00	CARBON	330K	5%	1/4W	C254	1-104-319-11	POLYSTYRENE	10000PF 10% 125V
R412	1-247-725-11	CARBON	10K	5%	1/4W	C256	1-125-582-11	ELECT	470uF 20% 63V (Germany)
R413	△ 1-216-476-11	METAL OXIDE	180	5%	3W F	C257	1-104-319-11	POLYSTYRENE	10000PF 10% 125V
< VARIABLE RESISTOR >									
RT101	1-224-249-XX	RES, ADJ. METAL GLAZE 1K			C302	1-104-233-00	POLYSTYRENE	220PF 10% 125V (Germany)	
RT102	1-224-247-XX	RES, ADJ. METAL GLAZE 100			C501	1-123-380-00	ELECT	1uF 20% 100V	
< CONNECTOR >									
VH3	1-564-320-00	PIN, CONNECTOR 2P			C502	1-136-157-00	FILM	0.022uF 5% 50V	
VH4	* 1-564-243-00	PIN, CONNECTOR 6P			C503	1-126-163-11	ELECT	4.7uF 20% 50V	
VH6	* 1-564-104-00	PIN, CONNECTOR 3P			C504	1-136-157-00	FILM	0.022uF 5% 50V	
*****									
* A-4345-340-A MAIN (B-R) BOARD, COMPLETE (US)									
* A-4345-355-A MAIN (B-R) BOARD, COMPLETE (Germany)									
* A-4345-339-A MAIN (B-L) BOARD, COMPLETE (US)									
* A-4345-354-A MAIN (B-L) BOARD, COMPLETE (Germany)									
*****									
* 1-632-120-11 DRIVE BOARD									
*****									
* 1-632-121-11 FUSE BOARD									
*****									
* 1-632-122-11 SELECTOR BOARD									
*****									
* 1-632-123-11 SP.TM BOARD									
*****									
* 1-633-166-11 LED (L) BOARD									
*****									
* 1-633-167-11 LED (R) BOARD									
*****									
1-533-183-11 HOLDER, FUSE									
1-535-476-11 TERMINAL									
* 1-535-730-21 LEAD, JUMPER (OFC)									
* 1-560-242-11 BUS BAR 3P									
* 1-560-242-21 BUS BAR 4P									
1-565-063-11 BAR, BUS									
* 4-835-639-00 PLATE, GROUND									
< CAPACITOR >									
C1	1-161-742-00	CERAMIC	0.0022uF	20%	400V	< TRANSISTOR >			
C201	1-104-233-00	POLYSTYRENE	220PF	10%	125V	Q215	8-729-184-53	TRANSISTOR	2SC1845-EA
C202	1-104-233-00	POLYSTYRENE	220PF	10%	125V	Q216	8-729-140-82	TRANSISTOR	2SA988-PAFAEA
C203	1-125-582-11	ELECT	470uF	20%	63V (Germany)	Q265	8-729-184-53	TRANSISTOR	2SC1845-EA
C204	1-104-319-11	POLYSTYRENE	10000PF	10%	125V	Q266	8-729-140-82	TRANSISTOR	2SA988-PAFAEA
C206	1-125-582-11	ELECT	470uF	20%	63V (Germany)	Q501	8-729-141-03	TRANSISTOR	2SA733-QP
C207	1-104-319-11	POLYSTYRENE	10000PF	10%	125V	Q502	8-729-141-03	TRANSISTOR	2SA733-QP
C209	1-123-369-00	ELECT	4.7uF	20%	63V	Q503	8-729-281-54	TRANSISTOR	2SC1815BL
C251	1-104-233-00	POLYSTYRENE	220PF	10%	125V	Q504	8-729-200-95	TRANSISTOR	2SJ74
C252	1-104-233-00	POLYSTYRENE	220PF	10%	125V				

Note: The components identified by mark △ or dotted line with mark △ are critical for safety. Replace only with part number specified.

MAIN(B-R)	MAIN(B-L)	DRIVE	FUSE	SELECTOR	SP.TM
LED(L)	LED(R)				

Ref. No.	Part No.	Description			Remark	Ref. No.	Part No.	Description			Remark						
< RESISTOR >																	
R1	△ 1-259-671-11	CARBON	620	2%	1W	R265	△ 1-217-997-11	FUSIBLE	10	5%	1/2W						
R201	△ 1-219-010-11	FUSIBLE	33	5%	1/2W	R266	△ 1-217-997-11	FUSIBLE	10	5%	1/2W						
R202	△ 1-219-010-11	FUSIBLE	33	5%	1/2W	R267	△ 1-217-997-11	FUSIBLE	10	5%	1/2W						
R204	△ 1-217-997-11	FUSIBLE	10	5%	1/2W	R268	△ 1-217-997-11	FUSIBLE	10	5%	1/2W						
R205	△ 1-217-997-11	FUSIBLE	10	5%	1/2W	R269	1-219-117-11	RES. WIREWOUND	(0.47+0.47	3W)							
R206	△ 1-217-997-11	FUSIBLE	10	5%	1/2W	R270	1-219-117-11	RES. WIREWOUND	(0.47+0.47	3W)							
R207	△ 1-217-997-11	FUSIBLE	10	5%	1/2W	R271	1-219-117-11	RES. WIREWOUND	(0.47+0.47	3W)							
R208	△ 1-219-079-11	FUSIBLE	47	5%	1W	R272	1-219-117-11	RES. WIREWOUND	(0.47+0.47	3W)							
R209	△ 1-217-997-11	FUSIBLE	10	5%	1/2W	R273	1-219-117-11	RES. WIREWOUND	(0.47+0.47	3W)							
R210	△ 1-217-997-11	FUSIBLE	10	5%	1/2W	R274	△ 1-219-038-11	FUSIBLE	470	5%	1/2W						
R211	△ 1-217-997-11	FUSIBLE	10	5%	1/2W	R275	1-247-713-11	CARBON	1K	5%	1/4W						
R212	△ 1-217-997-11	FUSIBLE	10	5%	1/2W	R276	1-247-713-11	CARBON	1K	5%	1/4W						
R213	△ 1-217-997-11	FUSIBLE	10	5%	1/2W	R277	1-249-460-11	CARBON	15K	5%	1/4W						
R214	△ 1-217-997-11	FUSIBLE	10	5%	1/2W	R278	1-249-460-11	CARBON	15K	5%	1/4W						
R215	△ 1-217-997-11	FUSIBLE	10	5%	1/2W	R279	1-249-460-11	CARBON	15K	5%	1/4W						
R216	△ 1-217-997-11	FUSIBLE	10	5%	1/2W	R280	1-249-460-11	CARBON	15K	5%	1/4W						
R217	△ 1-217-997-11	FUSIBLE	10	5%	1/2W	R281	1-247-721-11	CARBON	4.7K	5%	1/4W						
R218	△ 1-217-997-11	FUSIBLE	10	5%	1/2W	R282	1-249-497-11	CARBON	33K	5%	1/4W						
R219	1-219-117-11	RES. WIREWOUND	(0.47+0.47	3W)		R283	1-249-661-11	CARBON	330	5%	1/2W						
R220	1-219-117-11	RES. WIREWOUND	(0.47+0.47	3W)		R301	△ 1-259-749-11	CARBON	10	2%	2W						
R221	1-219-117-11	RES. WIREWOUND	(0.47+0.47	3W)		R501	1-249-945-11	CARBON	8.2K	1%	1/4W						
R222	1-219-117-11	RES. WIREWOUND	(0.47+0.47	3W)		R502	1-247-717-11	CARBON	2.2K	5%	1/4W						
R223	1-219-117-11	RES. WIREWOUND	(0.47+0.47	3W)		R503	1-247-725-11	CARBON	10K	5%	1/4W						
R224	1-219-038-11	FUSIBLE	470	5%	1/2W	R504	1-247-725-11	CARBON	10K	5%	1/4W						
R225	1-247-713-11	CARBON	1K	5%	1/4W	R505	1-247-721-11	CARBON	4.7K	5%	1/4W						
R226	1-247-713-11	CARBON	1K	5%	1/4W	R506	1-247-725-11	CARBON	10K	5%	1/4W						
R227	1-249-460-11	CARBON	15K	5%	1/4W	R507	1-249-513-11	CARBON	24	5%	1/4W						
R228	1-249-460-11	CARBON	15K	5%	1/4W	R508	1-247-721-11	CARBON	4.7K	5%	1/4W						
R229	1-249-460-11	CARBON	15K	5%	1/4W	R509	1-246-545-00	CARBON	1.0M	5%	1/4W						
R230	1-249-460-11	CARBON	15K	5%	1/4W	R510	1-247-703-11	CARBON	180	5%	1/4W						
< RELAY >																	
R231	1-247-721-11	CARBON	4.7K	5%	1/4W	RY301	1-515-703-11	RELAY									
R232	1-249-497-11	CARBON	33K	5%	1/4W	RY302	1-515-703-11	RELAY									
R233	1-249-661-11	CARBON	330	5%	1/2W	RY303	1-515-703-11	RELAY									
R251	△ 1-219-010-11	FUSIBLE	33	5%	1/2W	< SWITCH >											
R252	△ 1-219-010-11	FUSIBLE	33	5%	1/2W	S101	1-572-074-11	SWITCH, ROTARY	(INPUT SELECTOR)								
R254	△ 1-217-997-11	FUSIBLE	10	5%	1/2W	< CONNECTOR >											
R255	△ 1-217-997-11	FUSIBLE	10	5%	1/2W	VH1	1-564-320-00	PIN, CONNECTOR	2P								
R256	△ 1-217-997-11	FUSIBLE	10	5%	1/2W	VH2	1-564-320-00	PIN, CONNECTOR	2P								
R257	△ 1-217-997-11	FUSIBLE	10	5%	1/2W	VH8	* 1-564-241-00	PIN, CONNECTOR	4P								
R258	△ 1-219-079-11	FUSIBLE	47	5%	1W	VH9	* 1-564-243-00	PIN, CONNECTOR	6P								
R259	△ 1-217-997-11	FUSIBLE	10	5%	1/2W	VH10	* 1-564-104-00	PIN, CONNECTOR	3P								
R260	△ 1-217-997-11	FUSIBLE	10	5%	1/2W												
R261	△ 1-217-997-11	FUSIBLE	10	5%	1/2W												
R262	△ 1-217-997-11	FUSIBLE	10	5%	1/2W												
R263	△ 1-217-997-11	FUSIBLE	10	5%	1/2W												
R264	△ 1-217-997-11	FUSIBLE	10	5%	1/2W												

Note: The components identified by mark **△** or dotted line with mark **△** are critical for safety. Replace only with part number specified.

IC

Ref. No.	Part No.	Description	Remark
	* 1-633-170-11	IC BOARD	
*****			
		< IC >	
IC501 8-759-947-34 IC LM35DZ			
*****			
MISCELLANEOUS			
*****			
174	1-533-185-11	HOLDER, FUSE (US)	
CNP1	△ 1-559-271-11	CORD, POWER (Germany)	
CNP1	△ 1-559-479-11	CORD, POWER (US)	
F1	△ 1-532-325-00	FUSE, TIME-LAG (6. 3A) (Germany)	
F1	△ 1-532-510-00	FUSE, GLASS TUBE (8. 0A) (US)	
J1	1-568-918-11	JACK, PIN 1P (UNBALANCED)	
J2	1-568-918-11	JACK, PIN 1P (HOT)	
J3	1-568-918-11	JACK, PIN 1P (COLD)	
J4	1-568-917-11	CONNECTOR, CANON (SOCKET) 3P (BALANCED)	
M501	1-520-507-11	METER	
S1	1-554-538-00	SWITCH, PUSH (AC POWER) (1 KEY) (POWER)	
S201	1-576-080-11	THERMOSTAT	
S251	1-576-080-11	THERMOSTAT	
T1	1-424-299-11	TRANSFORMER, LINE	
T2	△ 1-450-490-11	TRANSFORMER, POWER (US)	
T2	△ 1-450-491-11	TRANSFORMER, POWER (Germany)	
TM301	1-537-248-11	TERMINAL BORAD (SPEAKER 2P)	
*****			
ACCESSORIES & PACKING MATERIALS			
*****			
3-703-450-01 INSTRUCTION (US)			
3-751-053-11 MANUAL, INSTRUCTION (English, French, Spanish, Portuguese) (Germany)			
3-751-053-21 MANUAL, INSTRUCTION (English) (US)			
3-751-053-41 MANUAL, INSTRUCTION (German, Dutch, Swedish, Italian) (Germany)			
4-362-304-00 GUARD, PLUG			
* 4-935-245-01 CUSHION			
* 4-945-283-01 INDIVIDUAL CARTON			

Ref. No.	Part No.	Description	Remark
HARDWARE LIST			
*****			

# 1	7-682-560-09 SCREW +B 4X6
# 2	7-682-650-09 SCREW +PSW 3X12
# 3	7-682-561-09 SCREW +B 4X8
# 4	7-685-646-79 SCREW +BVTP 3X8 TYPE2 N-S
# 5	7-685-144-19 SCREW +P 3X5 TYPE2 NON-SLIT
# 6	7-683-425-04 BOLT, HEXAGON SOCKET 4X20
# 7	7-685-645-79 SCREW +BVTP 3X6 TYPE2 N-S
# 8	7-682-547-09 SCREW +B 3X6
# 9	7-682-562-04 SCREW +B 4X10
#10	7-624-105-04 STOP RING 2.3. TYPE -E
#11	7-682-548-09 SCREW +B 3X8
#12	7-682-147-15 SCREW, TR
#13	7-682-552-04 SCREW +BVTT 3X16 (S)
#14	7-682-148-15 SCREW, TR
#15	7-682-149-15 SCREW, TR
#16	7-682-248-09 SCREW +RK 3X8
#17	7-682-566-09 SCREW +B 4X20
#18	7-682-580-09 SCREW +B 5X25
#19	7-682-551-09 SCREW +B 3X14
#20	7-682-575-09 SCREW +B 5X10
#21	7-682-569-09 SCREW +B 4X35
#22	7-682-666-09 SCREW +PSW 4X20
#23	7-682-581-09 SCREW +B 5X30
#24	7-688-005-01 WASHER, PICTURE TUBE
#25	7-688-004-02 W 4, SMALL
#26	7-682-577-09 SCREW +B 5X14
#27	7-684-024-04 N 4, TYPE 2
#28	7-623-210-22 SW 4, TYPE 2

Note: The components identified by mark  or dotted line with mark  are critical for safety. Replace only with part number specified.